Great Floods in Northeast States

Special Reports

Engineering News-Record

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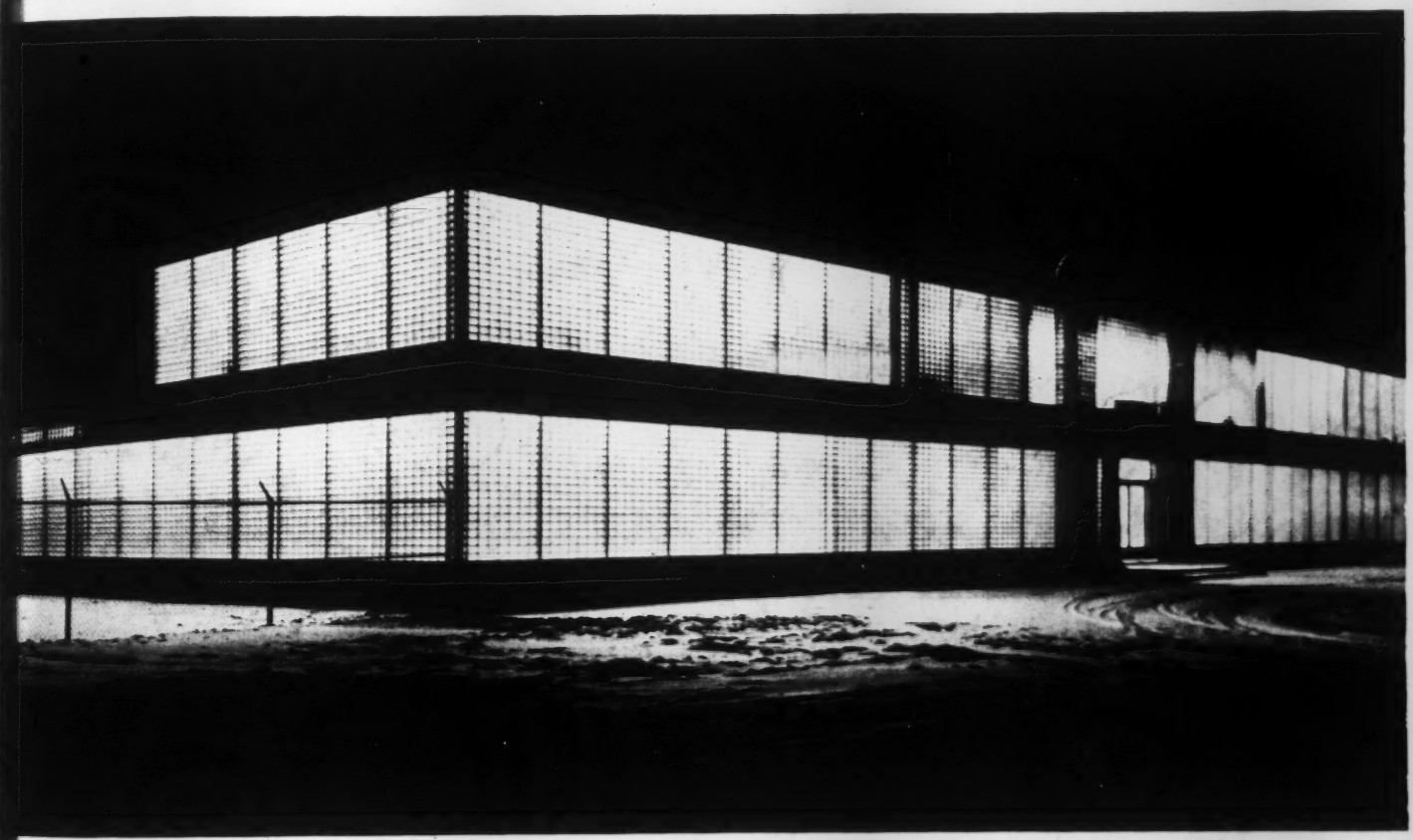

Nocturne of the new glass block building of the Owens-Illinois company at Toledo

IN THIS ISSUE:

Redesign of Fort Peck Diversion Tunnels

Chemical Treatment for New Brunswick Sewage

Windowless Buildings for Industry

Beginning a New Series: Soil Mechanics Applied to Dam Design

GRAHAM HUNTER
THEY JUST FINISHED ME. I'LL BET I'M THE BEST ROAD IN THE STATE!
MAYBE SO — ON THE SURFACE, — BUT THAT'S ONLY PART OF THE STORY.
1
THE GROUND UNDER ME IS GETTING MUSHY. I'M AFRAID I DON'T FEEL WELL WITH HEAVY TRAFFIC POUNDING ME DOWN!!
I DON'T MIND THIS AT ALL. I HAVE A DRAINAGE SYSTEM OF ARMCO PERFORATED IRON PIPE THAT KEEPS MY FOUNDATION COMPARATIVELY DRY AND STABLE
2
WELL, I GUESS I'M ABOUT DONE FOR. BUT I LIVED HIGH ON EXCESS MAINTENANCE WHILE I LASTED!
GEE! I FEEL AS YOUNG AS EVER!! NO CRACKS OR WRINKLES! I CARRY TRAFFIC SAFELY AND I DON'T REQUIRE MUCH MAINTENANCE.
3

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SCRAPPING for Economy

CERTAIN passages in the annual report of the United States Steel Corporation lend added point to the series of articles on industrial building design now running in this journal. Those passages refer to the plans that have been formulated by the management of the corporation "most fully to realize its opportunities in the period of general business expansion which is anticipated for the future."

Many engineers and industrialists are quite aware of the toll that has been taken of industrial plant and facilities by five years of deferred maintenance and replacement. Already a marked increase in the volume of industrial construction has begun to reflect the effort of management to make good that depreciation. As business resumes its normal stride this increase will continue.

BUT not everyone is so conscious of that subtle but none the less destructive depreciation that results from obsolescence. It is recognized by the Steel Corporation in certain adjustments of its property-investment account designed to effect a reduction of net book values.

"These adjustments," says the report, "are attributable to the development in the art and mechanics of steel making which have operated *to reduce the normally expected life of such facilities,* and the changes in plant location based on shifting markets and transportation facilities."

The italics are by this writer: they are intended to emphasize that the present productive value of any facility may show scant respect for its "normally expected life" at the time it was built or installed.

After careful analysis of its plant investment from the viewpoint of plant locations and manufacturing facilities, the rapid development of equipment and methods and changes in consumer demand, the Steel Corporation writes off more than $280,000,000, over and above the usual depreciation and depletion charge of $44,000,000. Every engineer and executive responsible for plant and facilities will find here food for thought. Intimately related is the announcement, in connection with the report, of an extensive program of construction and rehabilitation in view of the present or prospective abandonment of obsolete units. Thus only can Big Steel be prepared "most fully to realize its opportunities."

Needless to say, obsolescence does not confine its ravages to the "art and mechanics of steel making." Many other processes and facilities, which on the surface may appear to be as sound and serviceable as ever, may in fact be worth in service value but a fraction of their original cost or their "reproduction cost new."

Railroads, highways, buildings, contractors' equipment—all these and many more are due right now for the same "extensive program of construction and rehabilitation" that its management has prescribed for the Steel Corporation. During recent years many such facilities have stood still while the technique of their fields have marched on; many have been starved even for the maintenance required to keep them safely serviceable. But at its best, maintenance eventually reaches a point of diminishing returns at which it no longer pays. With whatever patching at whatever cost, facilities constantly move toward obsolescence; at some point rebuilding or relocation becomes the course of highest economy.

TODAY much highway mileage, for example, is in this condition. Built ten or fifteen years ago to the highest of prevailing standards, many highways have become through obsolescence, not through deterioration, a hazard to their users and a headache to their administrators. Unfortunately, facilities such as railroads, highways and other public works and utilities are quite susceptible to such excessive obsolescence because no competitors in kind are available to illuminate excessive operating costs. But, for all that, the process goes on and those who would achieve the maximum of public economy will make sure that no false economy is permitted to thwart the reconstruction activities that are necessary to conserve the existing investment in our public facilities.

Just as the Steel Corporation and the other industries cited in the industrial construction series are scrapping and rebuilding to achieve true economy, so must those in charge of our highways and other public works constantly scrap and rebuild the plant for which they are responsible.

Willard Chevalier

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Despite the evil days on which the Florida Canal has fallen in Congress, the beginning of work last fall contemplated one of the greatest earth-moving operations of all waterway's history. An account of the work now in progress and planned will appear in the next issue.

Los Angeles street showing Atlas White Traffic Marker after three year's wear. Marker installed by Inlay Marker Co., Long Beach, Cal., under supervision of the City Engineer, Los Angeles

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M-7

ATLAS WHITE TRAFFIC MARKERS

ENGINEERING NEWS-RECORD

March 26, 1936

HARTFORD inundated by the waters of the Connecticut River.

Engineering Reports on

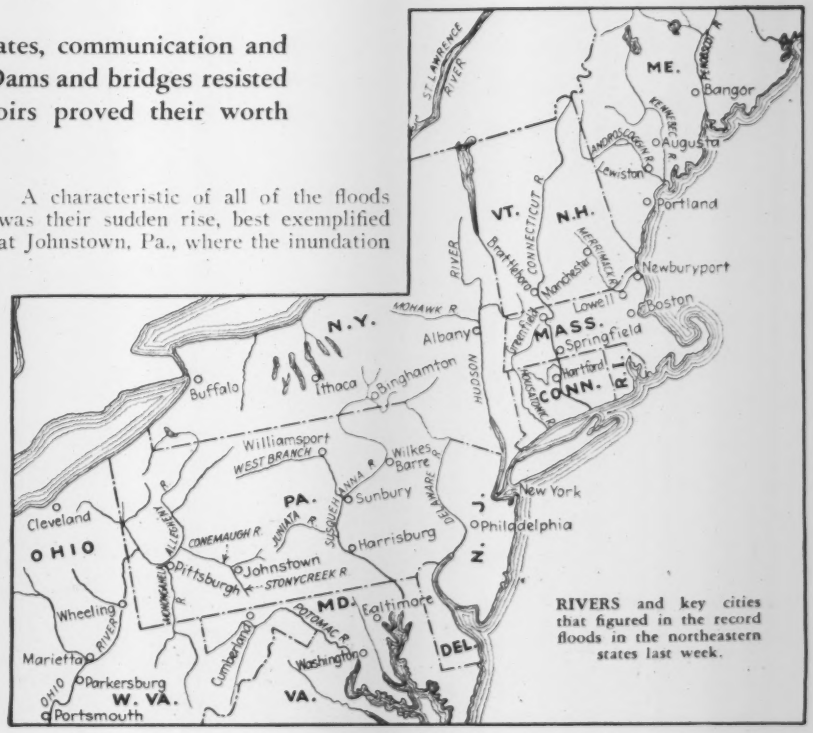
Record Floods

From New England to the Potomac

Cities submerged in ten states, communication and public service paralyzed—Dams and bridges resisted well and detention reservoirs proved their worth

FLASH FLOODS rising to unprecedented heights inundated the river valleys of the northeastern section of the country last week between Wednesday, March 18, and Saturday, March 21. Nearly every large river in the 200,000-sq.mi. region from the Canada line to Virginia and Ohio set new records of flood height and peak flow volume, submerging the lower districts of the valley cities and causing losses that are certain to reach totals of several hundred millions. Nearly 200 lives were lost, though no large numbers of deaths occurred at any one point. The major streams affected were the Allegheny and the Monongahela in Pennsylvania, the Ohio from Pittsburgh to Cincinnati, the Potomac in Maryland, the Susquehanna in New York and Pennsylvania, and the Connecticut, Merrimack, Androscoggin, Kennebec and Penobscot in New England. The floods in the Delaware and Hudson valleys were less severe.

A characteristic of all of the floods was their sudden rise, best exemplified at Johnstown, Pa., where the inundation



RIVERS and key cities that figured in the record floods in the northeastern states last week.

rivaled in both speed and intensity the famous flood of 1889 which was caused by a spectacular dam break. Rainfall, which was heavy and widespread over the entire area, encountered little to impede its runoff since the ground was either frozen or water-logged from melting snow. The small streams into which the water first found its way were running full from rains of the previous week, and spilled over into the lowlands. This condition reduced current violence, and was probably responsible for the relatively small amount of serious structural damage that occurred. Numerous bridges were washed out, highways were damaged and a few minor buildings collapsed, but major engineering disaster was absent. Of several small dams in New England that gave way, only one, a 92-yr. old timber and rockfill structure on the Farmington River west of Hartford, created the damaging velocity usually associated with failures of this kind.

The effect on railway and highway transportation, on electric power and water supply and to a lesser extent on telephone and telegraph communications was, on the other hand, particularly severe. Pittsburgh, Johnstown and Hartford were the principal centers where all community services were disrupted for an appreciable time. Steam power stations, water pumping plants and filters located in lowlands were easy marks for the high waters. The Pennsylvania railroad's main line was out of service for nearly two days because of the floods in central Pennsylvania. New England rail lines suffered comparable damage.

Preliminary figures on the river stages and discharges indicate that some cities may have experienced the so-called 1,000-yr. flood, or higher. The figures are startling in the extreme. At Pittsburgh a crest of 46 ft. was accompanied by a 640,000 sec.ft. discharge, slightly in excess of the discharge predicted by the Pittsburgh Flood Commission report of 1911 as the u'timate maximum. The previous record stage in 1907 was 38.7 ft. Runoff in the Allegheny and Monongahela watersheds is calculated at 45 sec.-ft. per sq.mile as against 24.3 in 1907. Down the Ohio, Wheeling recorded a 55.5-ft. stage, 2.5 ft. above the high point set in 1889.

At Harrisburg on the Susquehanna a discharge of 850,000 sec.-ft. exceeded the 1889 figure by 30 per cent. In Johnstown, the water, 18 ft. deep at the city hall, was only 1½ ft. below the 1889 dam-break mark. The Connecticut River at Hartford rose to a 37.6-ft. level as compared with 31.4 ft. in the flood of 1854.

In contrast to these figures are those which apply to the relatively few rivers upon which headwater detention reservoirs have been built. The Sacandaga Reservoir held down the Hudson flood. High water on the Winooski River in Vermont was reduced somewhat below the 1927 flood level, probably due in part to two flood-control reservoirs recently built at the headwaters. The Pymatuning reservoir held back the waters of the Beaver River so that they made no unusual contribution to the flood stages on the Ohio River.

Reconstruction plans

A flood rehabilitation allotment of $43,000,000 has been made by the President; the WPA is to repair or replace any damaged public property, from roads and bridges to sewers and electric plants.

Mayors and governors in the flooded states are asking for federal funds for rebuilding. Rep. Connery of Massachusetts introduced a resolution appropriating $10,000,000 to that state. Senator Copeland of New York introduced a bill that would make "flood control" a proper activity of the federal government. Senator Wagner of the same state urged that flood control is a purely federal problem "because the rushing waters of a flood do not stop at boundary lines." A bill that would provide $604,000,000 for flood control surveys and projects through an organized agency, preferably the War Department, has been reported out by a House committee.

WPA has sent representatives to the chief flooded cities. Col. Edgerton has gone to Harrisburg for the War Department, Gen. Spalding to the New England states, and Col. Powell to the Ohio River valley. The National Resources Committee has been called upon officially to furnish flood control data.

Loans through the RFC to manufacturers, farmers and homebuilders for repair and replacement and including equipment are proposed in a bill by Senator Walsh of Massachusetts and Senator Lonergan of Connecticut; the present restrictions would be waived.

Johnstown Flood Rivals '89 Dam Break

By H. W. Richardson
Assistant Editor, Engineering News-Record

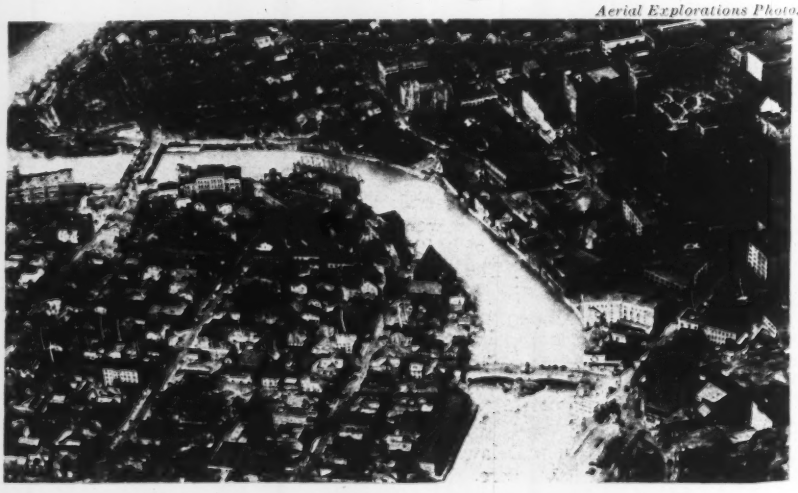
JOHNSTOWN at this writing (March 22) is a scene of inconceivable desolation, following devastation by a flood that rivaled the deluge caused by the historic dam break in 1889. The waters of the Little Conemaugh and Stony Creek Rivers raced through the entire business and industrial district and much of the residential area. At a crest depth of 18 ft. above curb at the city hall, they approached within 1½ ft. of the '89 flood. The highest previous flood other than that one is recorded as stage 18.6 in 1907; the March 18 flood this year reached stage 27.

The inundation gutted all business establishments and ruined their stocks, as water flowed even into the second story. Homes were wiped out by the hundreds, and many thousands of people lost all their belongings. A survey by contractors under the direction of the city assessor indicates that 4,500 dwellings and stores are affected; 77 buildings are totally destroyed and more than half the remainder are seriously damaged.

A detailed check of losses places the structural damage to homes and stores at $6,200,000, damage to their contents at $18,000,000. In addition the losses to

JOHNSTOWN DAMAGE, estimated at one-third of its $100,000,000 assessed valuation, included $1,000,000 worth of bridges. Steel truss at Franklin St. (center) was one of them. Water stood 18 ft. in the city hall, which faces park in upper right.

Aerial Explorations Photo.



CLEANING UP DEBRIS in Johnstown's streets from waters of Stonycreek and Little Conemaugh Rivers. The water line was above the three arched entrances to building in background.

industrial plant and equipment are estimated at $5,000,000, and the losses to utilities at $2,500,000. Damage to streets, bridges, sewers and other community equipment is rated at $1,250,000. The total damage of $33,000,000 is fully one-third the assessed valuation of the entire city.

Twenty to thirty dead as the direct result of the flood, and 16,000 destitute are being cared for in the upper stories of schools, while almost as many have been cared for by friends living on higher ground. Despite this serious condition health conditions are excellent. No disease has been reported in the city.

At present ten thousand CCC and WPA men are at work, with an equipment of 400 trucks, cleaning out mud and debris, which in some places accumulated to 8-ft. depth. The material is being dumped into the streams. The Bethlehem Steel Co. plant will resume partial operation Monday, which will give needed employment.

The city lost a number of its bridges —the Franklin, Poplar and Bridge St. structures, all of them steel trusses, and one plate girder bridge. The Bethlehem Steel Co. lost a long steel truss bridge. On the other hand, all eight concrete bridges in the city came through safely except for the loss of some railing steel. The railroad bridges within the city stood up, but one below was taken out. City Engineer H. Lee Wilson estimates the total bridge loss at $1,000,000.

The flood resulted from heavy rains that began Monday, March 16, falling on snow and frozen ground high on the west slope of the mountains. Though the combined drainage area of the Little Conemaugh and Stonycreek Rivers is only 520 sq. mi. the steep slopes and the ground conditions favoring quick runoff piled a tremendous volume of water into the narrow gorge in which the city is located. The Stonycreek is reported to have been the worst offender. The river started rising early Tuesday, March 17, was up to bank level by 10 in the morning and on the city's streets by noon. Rising at a maximum rate of 3 ft. per hour, the river reached its crest height at 1:30 a.m. Wednesday March 18. Then falling even more rapidly than it rose, it was back within its banks by 8 p.m. the same day.

Violent currents did much damage. Nearly all store fronts were wrecked.

Fortunately the city's water supply, coming from mountain reservoirs, never failed throughout the flood, which proved a blessing after the flood receded, in helping the work of cleaning up. The gas supply, on the other hand, remained out until Sunday, March 22. Direct current power supply to the business district also remained out four

SOME RIVER STAGE AND DISCHARGE DATA IN LAST WEEK'S FLOOD

From official measurements of district engineers of Water Resources Branch, U. S. Geological Survey, and other sources.

	1936 Flood Stage Ft.	1936 Flood Discharge Sec.-Ft.	Previous Record Stage Ft.	Previous Record Discharge Sec.-Ft.
Merrimack River				
Lowell, Mass.—4,420 sq.mi. net	67.6	168,000	60.6	104,000 (1852)
Connecticut River				
Vernon, Vt.	19.3	185,000	....	.....
Montague City, Mass.—7,840 sq.mi.	49.1	215,000	42.7	171,000 (1927)
Thompsonville, Conn.—9,640 sq.mi.	16.7	285,000	....	.....
Springfield, Mass.	28.6	.....	22.4	..... (1927)
Hartford, Conn.	37.56	.....	31.4	..... (1854)
E. Branch Delaware River				
Fish Eddy, N. Y.—783 sq.mi.	19:15	38,000	(3/18, 1 p.m.)	53,300 (8/24/1933)**
W. Branch Delaware River				
Hale Eddy, N. Y.—593 sq.mi.	14.0	21,000	(3/18, 4 p.m.)	46,000 (10/10/1903)
Delaware River				
Riegelsville*—6,340 sq.mi.	32.45	215,000	35.9	275,000 (3/19/36) (10/11/1903)
Belvidere, N. J.—4,540 sq.mi.	25.9	.....	28.6	..... (10/10/1903)
Port Jervis, N. Y.—3,076 sq.mi.	17.6	109,000	(3/18, 5 p.m.)	155,000 (10/10-11/1903)
Ohio River				
Pittsburgh, Pa.—19,106 sq.mi.	46.0	640,000	38.7	..... (1907)
Potomac River				
Point of Rocks, Md.—9,650 sq.mi.	41.3	332,000	40.2	320,000 (6/21/1889)
Harper's Ferry, Md.	36.6	.....	(3/18) 36.0	..... (1889)
Hancock, Md.	47.5	.....	39.7	..... (1889)
Hancock, Md.—4,070 sq.mi.	47.6	.....	(3/18) 39.7	..... (June, 1889)
Shepherdstown, W. Va.—5,940 sq.mi.	42.1	.....	(3/19) 39.2	..... (June, 1889)
Chain Bridge—11,600 sq.mi.	44.0	400,000	(3/20) 43.3	390,000 (6/18/1889)

Note—Lower tributaries of Potomac except Shenandoah were not at maximum flood stages in week of March 16-22, 1936. In June, 1889, these tributaries were at record stages.

S. Fork Shenandoah River				
Front Royal, Va.—1,640 sq.mi.	26.0	93,000	....	76,800 (3/1/1902)
Roanoke River				
Alta Vista, Va.—1,800 sq.mi.	27.0	31,000	29.3	34,700 (10/18/1932)
Clarksville, Va.—7,320 sq.mi.	16.3	116,000	18.0	..... (3/17/1912)
James River				
Buchanan, Va.—2,080 sq.mi.	26.8	73,600	31.0	..... (3/27/1913)
Cartersville, Va.—6,240 sq.mi.	28.8	138,000	26.7	122,000 (12/30/1901)
Richmond, Va.—6,760 sq.mi.	23.4	147,000		
Hudson River				
Hadley, N. Y.—1,664 sq.mi.	19.6	35,400	(3/18, 6 p.m.)	33,100 (4/12/1922)
Mechanicsville, N. Y.—4,500 sq.mi.	....	84,000	....	.....
Albany, N. Y.—8,100 sq.mi.	17.70	†220,000	(3/19, 2 p.m.) 21.45	240,000 (3/28/1913)
Mohawk River				
Cohoes, N. Y.—3,456 sq.mi.	22.6	134,000	(3/19, 5 a.m.)	114,000 (3/28/1913)
North Branch Susquehanna River				
Danville—11,220 sq.mi.	27.9	.....	26.07	..... (1902)
Wilkes-Barre—9,960 sq.mi.	33.07	.....	33.1	..... (1865)
Towanda—7,797 sq.mi.	25.03	.....	25.0	..... (1865)
Susquehanna River				
Binghamton, N. Y.	18.01	.....	(3/13) 24.80	.....
	22.85	.....	(3/18) (7/8-9/1935)	
Harrisburg, Pa.—24,100 sq.mi.	30.33	.....	26.8	..... (1889)
Juniata River				
Newport—3,354 sq.mi.	35.0	.....	35.9	..... (1889)

*Flood of March 19, 1936, was second highest known. Third highest occurred a week earlier, with gage height 29.8 ft. and discharge of 185,000 sec.-ft. March 12, 1936.

**1912 to date only.

†Estimated reduction by Sacandaga Reservoir storage 50,000 sec.-ft. or 4 ft. of stage.

days, because of flooding of the local generating plant. Heavy damage was done along the Conemaugh River below the city, including a bad washout on the Pennsylvania Railroad which interrupted its east-west service.

City officials have applied to Washington for funds to aid in rebuilding the city. It is proposed to undertake a federal slum clearance housing development to provide needed dwelling facilities.

Pittsburgh Experiences Maximum Flood

By Nathan B. Jacobs
Consulting Engineer, Morris Knowles, Inc., Pittsburgh, Pa.

THE FLOOD which the Monongahela and Allegheny Rivers disgorged at Pittsburgh last week was the worst in its history. On Wednesday, March 18, 1936, the gage reached a height of approximately 46 ft., more than 7 ft. higher than at any time since there has been an official gage. As this is being written (March 22) entrance to office buildings in most parts of the city is still prohibited, and electric service, water and transportation facilities have not been fully restored. It is also being written before official records are available, and allowance must be made for that fact as well as for the physical handicaps.

The previous high water record at Pittsburgh was established in 1907 at a gage height of 38.7. Because of the immense loss that was incurred from that flood, the Pittsburgh Flood Commission was formed, to study methods of preventing a recurrence of such a disaster. This commission submitted its report in 1911 and predicted that a future flood with a gage of 43 ft. might be expected, based upon a possible flow of the two rivers of 634,000 sec.-ft. In last week's flood, based upon the preliminary figures of the U. S. Engineers Office and the reported gage height, the peak flow at the Point where the Monongahela and the Allegheny Rivers join to form the Ohio River was approximately 640,000 sec.-ft. That the corresponding gage height of 46 ft. is 3 ft. higher than was anticipated by the Flood Commission with approximately its predicted runoff may be due to obstructions in the stream, encroachments upon the stream, navigation dams or reduced flood slope.

River stages

The city of Pittsburgh is located at the junction of the Monongahela and Allegheny Rivers, which form the Ohio River. The Allegheny River drains an area of 11,580 square miles, and the Monongahela 7,340 square miles. The drainage area of the Ohio River at its beginning represents, therefore, 18,920 square miles, located above Pittsburgh.

The city has always been subject to floods and severe freshets, and disastrous floods occur when these freshets coming simultaneously on the two watersheds, join at Pittsburgh. The flood stage at Pittsburgh is about 25 ft., an elevation that has been exceeded more than 80 times in the last century. A 5-ft. flood, or 30-ft. stage on the gage has been passed 28 times, and a 35-ft. stage 10 times.

The United States Weather Bureau records at Pittsburgh indicate the following figures in regard to this year's flood: On Monday, March 16, at 8 a.m. the gage at Pittsburgh stood at 19.8 ft. and was rising, due to melting snow and to rains of the previous week. Beginning on the night of Monday, March 16, rain fell on practically the entire Monongahela River watershed, and by the following morning the total precipitation was about 2 in. On that portion of the Allegheny River watershed between Parkers Landing and Pittsburgh there was about 1½ in. of precipitation, with little precipitation above Parkers Landing. By 8 a.m. Tuesday the Pittsburgh gage had risen to 24.7 ft., and the indications, based upon the Weather Bureau's prediction of rainfall, were for a probable river stage of 32 to 33 ft. by noon. However, rain fell all day and well into the night of the 17th, changing to snow late in the evening.

Scattered reports indicate that the precipitation by the morning of the 18th on the Monongahela watershed was about 1¼ in., and on the Allegheny watershed below Parkers Landing almost 2 in. Above Parkers Landing colder weather prevailed, and there was 14 in. of snow at Franklin on Wednesday, the 18th. The river gage at Pittsburgh rose to 42 ft. by 8 a.m. Wednesday, the Weather Bureau forecast a stage of 43.5 ft., for early afternoon, and by 7 p.m. the maximum stage of some 46 ft. was reached. The gage stood at about this height for almost 4 hours.

It would appear, therefore, that the rainfall at Pittsburgh was slightly more than 3 in. in the two days prior to March 18. However, independent observers on the watershed areas reported rainfalls of 5 in. or more in the vicinity of Johnstown.

Since the watersheds of both rivers were in practically a saturated condition due to the rains of the previous week, the ordinary rate of runoff was greatly increased during this period. As previously noted, it was the fact that the crest from both streams arrived simultaneously at Pittsburgh that brought about the condition of practically equalling and, as far as stage is concerned, exceeding the prediction of the Pittsburgh Flood Commission.

The flood traveled downstream from Pittsburgh without substantial contribution from the Beaver River, which enters the Ohio River 30 miles below. Reports indicate that the Beaver contribution was small due to the Pyma-

THE POINT AT PITTSBURGH where the Monongahela (right) and the Allegheny (above) unite to form the Ohio (left). A stage of 46 ft. at this location was 7.3 ft. above the previous high in 1907 and represented a discharge of 640,000 sec.-ft.

tuning Reservoir recently constructed on its headwaters. The crest at Wheeling, 60 miles below Pittsburgh, was reached at 3 p.m. on Thursday, March 19, at which time a stage of 55.5 ft. was reported, as compared with a flood stage of 36 ft. The 55.5 ft. stage was about 2½ ft. in excess of the 1884 flood, the previous maximum stage.

Runoff

It is possible to compare the runoff per square mile as indicated by the preliminary figures with those which actually occurred during the previous high stage in 1907. Of the total area of the Allegheny River watershed, some 6,823 square miles are located south of Parkers Landing contributory to the 86 miles of the river between that city and its mouth at Pittsburgh. On the other hand, the rainfall covered practically the entire 7,340 square miles of drainage area of the Monongahela, whose thread is about 245 miles. The maximum rate of flow from the total drainage area of the two rivers (18,920 squares miles) was 34 sec.-ft. per square mile. However, since the bulk of this runoff came from the Monongahela and the lower Allegheny, the indicated runoff from this area is equivalent to 45 sec.-ft. per square mile. The computed record of the discharge during the 1907 flood was 24.3 sec.-ft. per square mile.

Water supply

In addition to the municipal waterworks, the city of Pittsburgh is supplied by three privately owned water utilities. There is a distinct geographical distribution of territory between these four utilities. The municipal waterworks supplies peninsular Pittsburgh between the two rivers, all of old Allegheny lying north of the Allegheny River and the Ohio River, and part of the South Side lying south of the Monongahela and Ohio Rivers. A small part of the eastern section of the city is supplied by the Pennsylvania Water Co. A part of the South Side is supplied by the South Pittsburgh Water Co., and a few consumers in the northwestern part of the city are supplied by the Pittsburgh Suburban Water Co. All of these agencies made valiant efforts and are deserving of much credit and recognition for maintaining as good service as possible. Outstanding was the Pennsylvania Water Co., which had sufficient storage to furnish continuous service to its consumers in spite of the fact that it was necessary to shut down the pumping plant on the Allegheny River at Nadine.

The South Pittsburgh Water Co., taking its supply from the Monongahela at Becks Run, was forced to curtail service for about two days. Service was resumed to a portion of the consumers on Friday, March 20.

WHEELING ON THE OHIO registered a 55.5-ft. stage, 2.5 ft. above the 1884 record. Bridges, including the historic suspension structure, leading to Wheeling Island, which was completely inundated.

The Pittsburgh Suburban Water Co., whose pumping station is located on Neville Island with wells out in the Ohio River, was, of course, more seriously handicapped.

The supply of the municipal waterworks is obtained from the Allegheny River at Aspinwall, 7 miles above the Point. The low-lift pumping station, known as the Ross Station, at this point is a steam-operated installation, pumping the raw river water to the sedimentation basins of the filtration plant, the water flowing by gravity through slow sand filters to a covered clearwater reservoir. The water did not rise high enough to cover this reservoir, so that there was no pollution. Water is pumped to the city from two stations—the Brilliant pumping into the main reservoirs supplying peninsular and South Side Pittsburgh, and the Aspinwall supplying the North Side. Late in the evening of March 17 the floodwaters reached and flooded the Ross station. At this time there were some 350,000,000 gal. of water in storage in the distribution system, and this was supplemented during the day of March 18 by drawing down the sedimentation basins as far as was permitted, still maintaining some water at the filter level. In this way, 20 or 30 million gallons of additional water were made available at the Brilliant pumping station. Although the flood reached this station, it was possible by barricading the building and calking the doors and windows to maintain its electric pumps. The Ross station, which is the only low-lift station, was the key to the whole situation, and this station was restored to service by noon of Saturday, March 21. Twelve hours were required to restore the level on the sedimentation basin and filters, so that pumping could again be resumed to the distribution system.

Electric, gas and transportation

Electric service in the city of Pittsburgh proper is furnished for the most part by the Duquesne Light Co., and many of the surrounding boroughs in the county are supplied either by this company or the West Penn Power Co. The Duquesne Light Co.'s Colfax station, 264,000 kw., went out of service at 3:55 p.m. on Wednesday, the 18th, at the peak of the flood. The power company had constructed bulkheads around the plant, but on one side of the station a small retaining wall overturned so that the water found its

PRECIPITATION DATA FROM U. S. WEATHER BUREAU

Place	Total Rainfall Week Ending Mar. 17	Rainfall—Preceding 24 Hours Ending at 8 a.m. on Mar. 16	17	18	19	20	Total Rainfall Mar. 16-20
Eastport, Me.	1.6	0	0.02	0	0	0.24	0.26
Northfield, Vt.	2.8	0.1	1.36	0.18	...	0.10	1.84
Concord, N. H.	...	0	0.02	0.10	2.46	0.10	2.68
Boston, Mass.	1.9	0	0	0	1.58	0.02	1.60
New Haven, Conn.	2.1	0	0	0.98	1.42	0	2.40
Ithaca, N. Y.	2.5	0.40	0.82	...	0.70	0.18	2.10
Binghamton, N. Y.	2.0	0.06	1.20	1.60	0.58	0.40	3.84
Albany, N. Y.	2.0	0	0.46	0.68	0.92	0.36	2.42
Scranton, Pa.	1.5	0	0.78	1.28	0.48	0.24	2.78
Harrisburg, Pa.	3.0	0	0.68	0.84	0.54	0.24	2.30
Lynchburg, Va.	...	0	0.86	3.26	0.36	0.04	4.52
Wytheville, Va.	1.6	0	1.40	1.06	0	0	2.46
Pikesville, Ky.	..	0.14	1.42	1.40	0.20	0.10	3.26
Elkins, W. Va.	2.6	0	1.86	1.70	0.50	0	4.06
Parkersburg, W. Va.	2.0	0.80	1.06	0.58	0.18	0	2.62
Pittsburgh, Pa.	2.6	0.40	1.68	0.72	0.24	0.01	3.05
Buffalo, N. Y.	2.1	0	0.72	1.94	0.14	0.32	3.12
Erie, Pa.	0.8	0.06	0.42	1.20	0.14	0.02	1.84

way into the generator room. The floodwater rose to a point 3 ft. above the base of the generators. One of two plants in Brunots Island went out in the evening of March 18.

From about 8 p.m. on Wednesday, March 18, the city was entirely without power or light. Service to key places, such as hospitals, dairies, municipal police and fire service, was established by obtaining some 50,000 kw. from the Windsor plant of the West Penn Power Co. and the Ohio-Edison Plant at Canton. By Thursday, March 19, this hook-up was sufficient to take care of about 70 per cent of the street-lighting load in addition to vital service.

The Pittsburgh district represents one of the greatest points of consumption of natural gas, particularly for the house-heating load. Throughout the entire district, gas service has been available without restrictions.

Transportation services were severely crippled by Wednesday, March 18. On March 19 service was restored to some extent and has been augmented from time to time. By Saturday, the 21st, more than one-third the full number of cars was operated, there were 345 cars in service out of a total of 1,300 cars regularly operated. This trolley-car service was supplemented by bus service. Practically all railroad service was interrupted at some time during the flood with the exception of the Panhandle Division of the Pennsylvania Railroad. The freight yards of the B.&O., the P.&L.E., and the P.R.R. were all inundated, and most of the warehouses were isolated by the floodwaters. There was no shortage of food stuffs.

There has been no competent estimate made of the damage from the flood. It is estimated that 110,000 people were out of their homes and taken care of in temporary public quarters. Conditions have been somewhat aggravated by false rumors, such as the rumored failure of the 16th St. Bridge, a modern steel structure.

The Pittsburgh Flood Commission in its 1911 report recommended the construction of seventeen reservoirs on the Allegheny and Monongahela Rivers above Pittsburgh. It is estimated that had the reservoirs been built, this flood stage could have been reduced from 46 to 35 ft., and the inundation of much of the valuable business property in the so-called Golden Triangle of Pittsburgh would not have occurred.

Susquehanna Floods Highest on Record

By H. W. Richardson
Assistant Editor, Engineering News-Record

A HEAVY RAIN of 2½ in., falling on March 14 and 15 on ground saturated from recently melting snows and running off into already full streams, caused the worst and highest floods on record in the valley of the Susquehanna River and its main tributaries—the Juniata and West Branch—on March 17-20. Previous high-water levels established by the flood of June, 1889, were exceeded from 2 to 5 ft.

For the first time in history the three main streams—the North Branch (main river above Sunbury), the West Branch and the Juniata worked together, their flood crests synchronizing to pile the waters of the Susquehanna at Harrisburg to new heights. Damage to property is not to be estimated at this writing.

At Harrisburg the crest reached a stage of 30.4 ft., 3.3 ft. over the previous recorded high, that of the 18[illegible] flood. Flood stage is 18 ft. At 7 a. Tuesday, March 17, the river start to rise from a 12.7 level, reaching t previous high stage of 27.1 at 2:30 a. Thursday. The peak of 30.4 w reached at 6 p.m. Thursday. Twel hours later the river had fallen to 2[illegible] ft. The peak discharge is estimated have been 850,000 sec.-ft., as compar with 699,000 sec.-ft. for the 1889 flood.

HARRISBURG, where the Susquehanna discharged 850,000 sec.ft. compared with the 699,000 sec.-ft. discharge in the record flood of 1889.
Aerial Explorations Photo.

Towns and cities along the main riv and the North Branch suffered chief from submergence; those on the Junia and West Branch were damaged b swift water as well as by submergence This is strikingly shown by the fa that not one bridge across the mai river was lost, while at least seve large steel structures across the Juniat were swept away.

For the most part, water supplies i the stricken towns in the Susquehann and Juniata valleys were not damaged though a few communities have suffered or are threatened with water famine Most of the valley towns obtain wate from mountain streams and high storag reservoirs that were unaffected.

Harrisburg gets its water from th river, the water supply system consist ing of a pumping plant at the river edge a filter plant on a island in the river and two storage reservoirs in the hill east of town. At 10 p.m. Wednesday the pumping plant went out as flood waters reached the pumps and engines. Thursday afternoon water overtopped the dikes around the filter plant, supposedly built to a height beyond all possible flood stage, putting the plant out of commission. The reservoirs, capable of storing 53,000,000 gal., were caught with only 35,000,000 gal. in storage, about a four-day supply. Immediately all industries not already out of service were ordered shut down, to conserve the supply. Temporarily, the Rutherford Water Supply Co., a private company that supplies east-bank communities below the city, is pumping nearly 1,000,000 gal. daily into the city supply.

At Harrisburg the entire south part of the city, including part of the business section and most of the industrial area, and the north side residential area were inundated. In the south part the water rose to second story levels; in the north part most of the homes were flooded two or three feet above the first floor level. All industries have been shut down, mostly because of threat to the water supply, though many plants are under water. Actual damage to property is mostly through submergence. The Market and Walnut St. bridges were closed early by flooding of approaches on the west end. The Pennsylvania Railroad kept a shuttle train in service across its river bridge, to serve the west bank communities.

Reports from Williamsport, on the West Branch, state that this industrial

Continued on p. 466

Twin 36-In. Wood-Stave Pipes Moved Bodily Across Channel

Assembled in cradle on shore, pipe is advanced into water as built—Exact buoyancy calculations and variable weight of wood necessitated careful balancing

IN EXTENDING Seattle's sewer system it has been necessary to build interceptors and outfalls to pick up the flow here and there and make delivery of sewage into Puget Sound. One of the items in the present program was construction of a trunk line across Salmon Bay, a part of the Lake Washington Canal, to connect the Ballard intercepting sewer on the north side with a 144-in. outfall on the south side. This crossing is about 1,250 ft. long, and the maximum water depth is 43 ft. The channel bottom at this point is of soft and uncertain character and might shift slightly under a sewer laid upon it. Partly on this account it was decided to make the crossing with continuous wood-stave pipe, which could be expected to remain serviceable under such conditions. The life of permanently submerged wood was believed to be "almost indefinite" (*ENR*, Jan. 23, 1936, p. 136).

The plan was to construct the pipe on the north shore and slide it into the water a little at a time as the assembly was completed. As the south shore has a relatively steep bank, that portion had to be built on a curve of 600-ft. radius. Advantage was taken of this circumstance to give the forward end of the line (as it advanced across the channel) a sort of sled-runner shape, which facilitated maintaining the desired low center of gravity in the advancing end and avoided any main channel problem of plowing in the mud.

Two pipes, each of 36-in. diameter, were chosen in preference to a single line of equivalent capacity because of the desire to keep velocities as high as possible and thus give better prospect of sweeping the siphon clear of any sediment or deposit at the low point. When the sewage flow drops down to a quantity that can be carried by one of the two lines, only one will be used.

The first operation was to dredge a trench across the bay 13 ft. wide and 10 ft. deep. After placement on the trench bottom, the pipe was to be covered with 5 ft. of backfill consisting of pit-run gravel to protect it from marine borers and dragging anchors. The dredging, involving a total of 10,050 cu.yd., was rather expensive because of the necessity for barging muck through the locks to be dumped in Puget Sound. Dredging was done with a clamshell at a cost of about $3.60 per cubic yard. The backfilling, 6,200 cu.yd., was placed at $1 per cu.yd.

The pipe section is of extra strength and thickness. The staves were machined from 3x6-in. selected clear fir stock and are 2½ in. thick. Galvanized steel bands, ¾ in. in diameter, encircle the pipe at spacings 10 in. apart. These bands were turned up to a tension that binds them slightly into the wood before swelling occurs. The swelling after immersion increases the tightness and puts an initial stress in the bands up to about 18,000 lb. per sq.in., or one-third their elastic limit.

The first 225 ft. of the pipe to be built was assembled on curved cradles to give the finished pipe the curvature of 600-ft. radius that would fit the opposite bank. After this much of the line was completed, the cradles were altered so the remainder of the line would be built on tangent. The last few hundred feet, however, were given a slight curve to fit the north bank

FIG. 1—ASSEMBLING wood-stave pipe on shore. Channel to be crossed is in background.

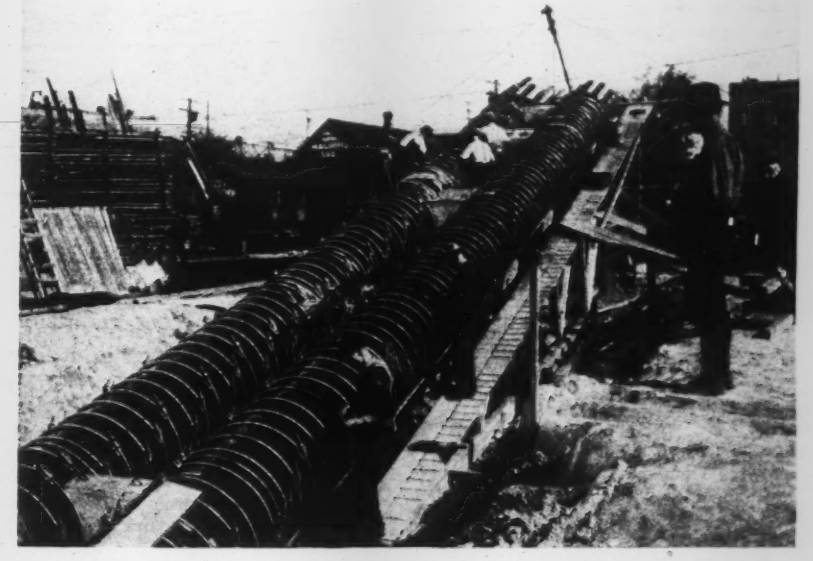


FIG. 2—BANDING the continuous wood-stave pipes. The concrete blocks between the pipes serve the dual function of weights and spacers.

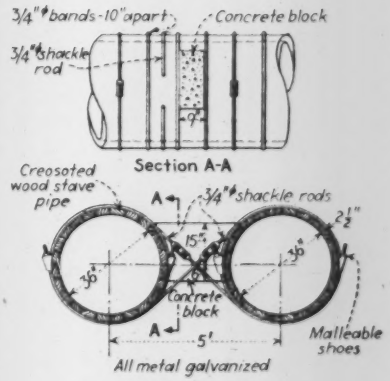


FIG. 3—DETAILS of the wood-stave pipe assembly.

slope. To avoid having the forward end of the line project above water as it advanced across the channel and thus lose buoyancy or set up a tendency to tip, the first 28 ft. of the line were omitted and will be placed by diver as a final operation. Thus, the line could be weighted to give it slight negative buoyancy and could be moved across the channel with all parts submerged throughout the entire operation. A small barge was attached to the forward end of the line as a marker and watchman's station. The barge was not used for buoyancy, however. The weight of the pipe itself was so controlled as to be entirely independent in that respect.

The twin assembly was shoved rather than pulled across the channel. That is, in order to avoid putting the joints in tension, a cable was passed over a sheave at the far side of the channel, carried back through guides on the bottom of the pipe assembly to a fastening near the rear end of the completed portion of the line. The hoisting engine that provided the power was located near the assembly cradles. The manufacturing ways are 80 ft. long, and once a day, or at convenient intervals, about 40 ft. of the line was advanced by taking up on the cable to the power-driven hoist. The slight and accurately controlled negative buoyancy in the pipe line made this cable manipulation a simple operation.

The inclined assembly platform, or "ways," was built up on the north shore with ample space for the workmen on either side. The pipe was put together on cradles mounted on double-flanged wheels. These wheels were fitted to rails on the inclined platform consisting simply of a timber strip faced on its upper side with a $\frac{3}{4}$x2-in. steel strap. The successive cradles, each about 12 ft. long, carried the weight of the pipe until it was immersed and buoyancy began to relieve the cradle of its weight. The cradles were then removed under water and brought back up the inclined platform to be placed in position for the next succeeding portion of the pipe.

One of the most difficult features of the job was to regulate and control the weight of the twin line, so that it would have just the desired amount of negative buoyancy. Careful and constant check of the weight of the timber used was an essential. Each lot of timber had to be tested, as only by trial could exact weight be determined. Sometimes as much as 50 per cent difference was recorded in unit weight of creosoted timber of the same material and dimensions.

Although the pipe itself has a good deal of rigidity, it was desired to vary the weighting so that uplift moments would be balanced exactly and no strain would be put on the fulcrum. To keep the advancing end of the pipe out of the mud, two small tanks were attached at the head end to add to the buoyancy at this point. The first 215 ft. of the pipe at the advancing end was expected to move across the channel without contacting the ground, and thus great care was necessary in calculating buoyancy. Actual trial of the material to be used in the pipe showed that allowing for the absorption that would occur after five days of immersion the assembled and banded pipe would weigh 6.6 lb. per lin.-ft. submerged. With this weight as a basis for buoyancy calculations, concrete weights were cast and were put in between the pair of pipes at varying intervals. At each concrete weight one or two $\frac{3}{4}$-in. steel rods with turnbuckles, as shown in the accompanying illustrations, were used to draw the two pipes together.

The concrete weights were cast in two sizes, and the variation in desirable weighting of the line per lin.-ft. was accomplished by varying the spacing between the weights. The larger blocks of concrete weighed 221 lb. each immersed (371 lb. in air), and the smaller blocks 211 lb. each, immersed. The first 100 ft. of the twin pipe assembly had only one weight for each 15 ft. of length. Farther back two weights were used 15 ft. apart, and this spacing was gradually reduced until it reached a maximum of two weights 7 ft. apart.

Despite the nicety of buoyancy balance that it was necessary to maintain, the original plan of construction was carried out effectively, and the pipe was completed and connections were made in a working period of about 60 days. The cost of the pipe in place in the trench for a channel length of 1,244 ft. was $16 per lin.-ft. of 36-in. pipe, or $39,808 for the 2,488 ft. in the twin line.

The line was designed by the Seattle city engineering department, T. H. Beeman city engineer. The general contract for $244,394, covering the intercepting sewer as a whole (of which this wood-stave siphon is a part), was held by L. Callucio. The pipe was built and placed by the Federal Pipe Co., of Seattle.

Chemical Precipitation to Be Used at New Brunswick Sewage Plant

Sedimentation aided by chemical coagulation expected to give 70 per cent reduction of suspended solids—Sludge to be digested and dewatered on vacuum filters

CONSTRUCTION of additional sewerage facilities and a 9-m.g.d. sewage-disposal plant employing chemical precipitation, separate sludge digestion and vacuum filtration, has begun at New Brunswick, N. J. This is the second step in a program initiated for the abatement of pollution in the Raritan River, one of the major streams entering tributary waters of New York Harbor. Following closely upon the installation of the Perth Amboy mechanical chemical treatment works near the mouth of the river, the new plant, located 10 miles upstream, will be an important factor in reducing the pollutional load emanating from a number of industrial establishments and a tributary population of 38,000. The present flow of sewage is approximately 6 m.g.d., of which 1½ m.g.d. is trade waste.

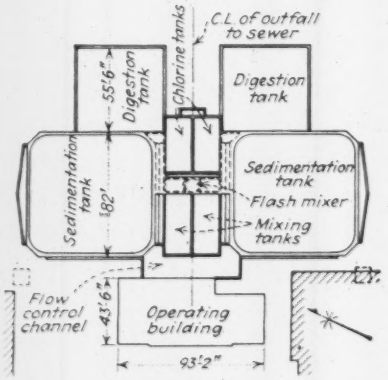


FIG. 1—SYMMETRICAL in layout, the New Brunswick, N. J., 9-m.g.d. sewage-disposal plant will occupy an area of less than one acre.

Raw sewage now entering the river at seven outlets along the waterfront will be diverted into a trunk-sewer system 2.7 miles in length and varying in size from 16 to 30 in. Because of topographical conditions in the city, part of the sewage will be pumped for 1½ miles through a 16-in. cast-iron force main leading to the 30-in. gravity sewer section that terminates in a wet well at the plant. Three vertical-driven centrifugal pumps with a capacity of 4, 6 and 8 m.g.d., respectively, will lift the sewage approximately 25 ft. to the treatment units, which are comprised of two sedimentation tanks located on opposite sides of a mixing basin where chemicals are added. Provided with suitable piping and valves, this arrangement has

been designed for flexibility in operation so that the tanks can be operated either in series or parallel, with or without preliminary chemical additions and mixing.

Chlorinated copperas and lime will be added to the sewage at the mixing basin where a flash mixer will provide a 1-min. period of rapid agitation. Following this, there will be a 20-min. flocculating period aided by paddles moving at right angles to the flow. The mixing tank is divided by a partition wall into two channels, each 17 ft. wide, 40 ft. long and 11 ft. deep. The sedimentation tanks, 82 ft. square with an average depth of 11½ ft., will be equipped with circular mechanical clarifiers. They have been designed on the basis of 1.25 hours' detention each at the maximum flow rate of 9 m.g.d. It is anticipated that the reduction in suspended solids will average 70 per cent. Plant effluent will be chlorinated before it is discharged into the river.

Settled sludge will be digested in two heated digestion tanks, each 55½ ft. square and 17 ft. deep. Their size is predicated on a storage capacity allowance of 2½ cu.ft. per capita. Gas will be collected and utilized for heating the tanks. Digested sludge will be conditioned with ferric chloride and then dewatered on two vacuum filters provided with a string discharge device; each filter has a rated capacity of 135 sq.ft. per hour. The dry filter cake will be used for filling low land.

An operating building will be constructed to house the pump motors, vacuum filters, heating boilers and metering mechanism. In addition to this equipment, all of which is located on the first floor, there will be space for chlorine storage, offices and a laboratory specially equipped to carry on elaborate research. The entire second floor of the building will be used for the storage of chemicals, which will be fed by gravity to the different plant units where they are to be applied.

The cost of the total project, which is financed by a PWA loan and grant, will be approximately $500,000; disposal-plant construction will amount to $280,000, sewers and a 3-m.g.d. pumping station will cost $130,000, and the balance of $90,000 will be applied toward land purchase and engineering fees.

Asher Atkinson is city engineer of New Brunswick, and Daniel M. Vail is designing engineer for the disposal plant.

Digestion-Tank Piping Simplifies Sludge and Supernatant Draw-off

By Daniel M. Vail
Designing Engineer, City of New Brunswick, N. J.

EXPERIENCE in the operation of separate sludge-digestion tanks has demonstrated the wisdom of providing a flexible method for withdrawing the contents at different levels of the tank, either for removal of supernatant, recirculation of the sludge, or for taking samples. In designing the digestion unit for the new plant at New Brunswick, N. J., a simple arrangement of piping and valves, shown in Fig. 1, has been devised to effect this purpose.

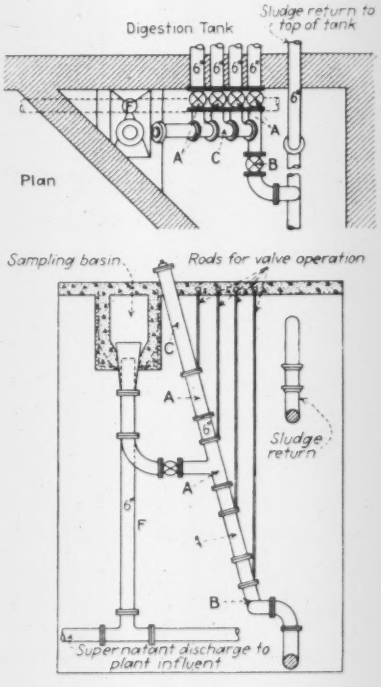
Adjacent to each tank a control unit has been provided in which are housed the piping, valves and a sampling basin. From a common header pipe (C) connections have been made through valves (A) to four different levels of the digestion tank. This header is also connected with a sampling basin and to the sludge pump. The valves marked A and the single valve B control the entire operation.

When it is desired to recirculate the sludge, valve B, connecting with the sludge pump, is opened. Then, by opening one of the A valves, sludge may be drawn from a selected depth and returned to the top level of the tank or to an adjacent tank. Thus the digestion process may be easily controlled and either tank may be properly "seeded" with a minimum of difficulty.

Supernatant liquor is withdrawn from the tank through the header pipe C into a sampling basin provided with a circular weir. This weir overflows into pipe F connected to the prechlorination manhole at the influent to the plant. The supernatant can thus be chlorinated immediately following its withdrawal. By proper manipulation of the A valve, sludge from either of four different levels in the digestors may also be drawn into the sampling basin. After a sample is obtained, the basin is emptied into the discharge pipe leading to the plant influent.

The circular weir arrangement is so placed as to be approximately 1 in. below the liquid level in the tank. This provides sufficient difference in hydrostatic head so that in operating the different valves A, samples of either supernatant or sludge will flow into the sampling basin.

The fitting at the top of the manifold C is a water connection for flushing the pipes, fittings and valves.



SLUDGE can be easily drawn from various levels in a digestion tank with this piping arrangement.

Rock-Depth Studies Being Made in New York City

Subsurface formations in the five boroughs of New York City are being studied by a staff of 41 men who are employed on a WPA project, known as the Rock Line Map of New York, under the direction of Dr. Charles P. Berkey, of Columbia University. The survey is concerned especially with the depth of the rock floor and the character of the rock and overburden. Besides showing the rock and foundation and overburden, the survey and maps will show the outlines of ancient creeks, bays and water courses as well as old natural shorelines. Borings will be made throughout the area, and the samples will be available for engineers and contractors in the city.

The borough engineers have made available the records of the departments over which they have control, and federal and state bureaus such as the Geological Survey furnish data. Also private foundation and excavation contractors have extended cooperation. It is estimated that there will ultimately be about 35,000 separate items, chiefly individual borings or excavations, and approximately 800 local or neighborhood maps on which borings, wells, foundations and excavations will be plotted. Borings are more numerous near the centers of the city and become less close together as the city spreads out.

Fort Peck Diversion Tunnels Redesigned for Faster Driving

Interior diameter reduced and triple lining of concrete and steel plates replaced by monolithic reinforced concrete to allow earlier completion of tunnels and diversion of river

BY REDUCING the interior diameter of the four diversion tunnels at Fort Peck Dam from 26 ft. to 24 ft. 8 in., and by changing the original design of lining from two layers of concrete and a steel-plate diaphragm to monolithic concrete, earlier completion of the tunnels and corresponding diversion of the river will be possible. The original contract for the tunnels, awarded in April, 1934, to the Mason & Walsh Co., called for a minimum excavated diameter of 32 ft. 2 in., and a 21-in. concrete lining embedding structural-steel ring ground supports. Completion of the first contract was scheduled for April, 1937. A second contract was then to be let for an inner lining of 1-in. steel plate, backed by 6 in. of grout, and a 9-in. thickness of concrete inside the steel, a finished diameter of 26 ft. Under this plan, diversion of the river and closure of the dam could not be made before 1938 at the earliest.

Placing of the dredged fill in the dam last season progressed so rapidly that it is now considered possible and desirable to make the closure in the summer of 1937. Performance records of the dredges in 1935 also indicated that a rate of placing fill was assured that would permit decreasing the size of the tunnels and still enable them to carry the river safely during the closure operations. Moreover, only one tunnel (No. 1) will be used at present for power generation. These considerations resulted in the elimination of the steel tube in all tunnels, except that portion of No. 1 tunnel from the control shaft to the outlet, and the decrease of finished diameter of all tunnels to 24 ft. 8 in. Failure to agree on a price for the changed design resulted in Mason & Walsh giving up their contract Jan. 15, 1936 (*ENR*, Jan. 16, 1936, p. 105), and the tunnels will be completed by government day labor.

The four tunnels, all in Bearpaw shale, have an aggregate length of 25,213 ft., varying from 5,366 to 7,240 ft. each. About one-third of the distance from the upper portals is a 50-ft.-diameter control shaft and a smaller emergency gate shaft for each tunnel. Under the original specifications the contractor was required to drive a 16x14-ft. center pilot heading the full length of each tunnel before starting enlarging work. These pilot tunnels, all driven from the inlet portals, were finished in remarkably fast time (*ENR*, May 23, 1935, p. 735). They were timbered throughout, and walls, floor and roof were sprayed with bitumen to prevent air slaking of the shale. Enlarging to full size and placing of lining were started from the lower portals only (*ENR*, Aug. 29, 1935, p. 296).

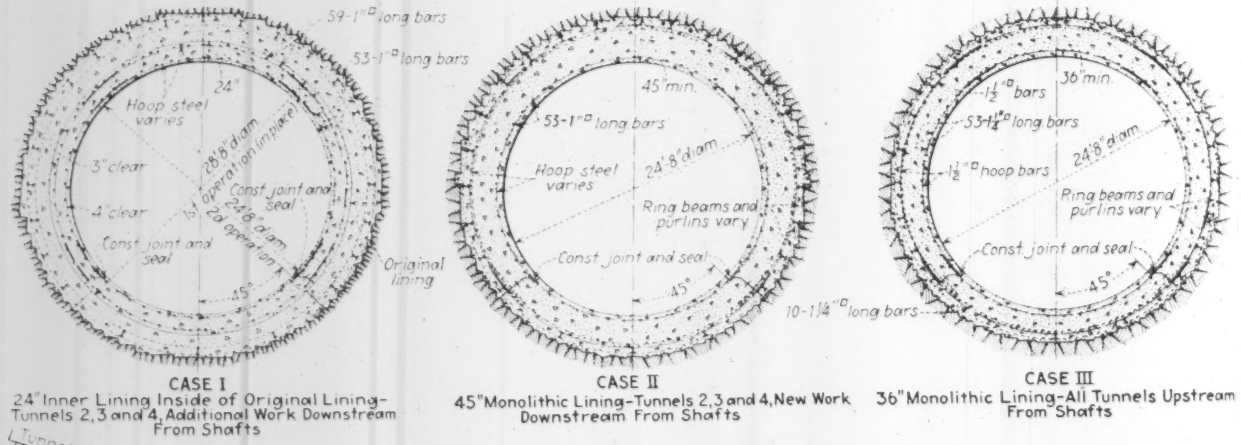
At first, full face enlargement by ring drilling from the pilot bores was tried, but later the heading and bench method was adopted on three of the tunnels.

At the time the government took over the tunnels in January, a total of 8,228 ft. of enlarging had been completed, and full lining (21 in.) had been placed for 6,175 ft. in the four tunnels, all downstream from the control shafts. From 250 to 400 ft. of invert had been placed in each tunnel in advance of the full section lining.

Four types of lining

The desire for faster driving, the decrease in finished diameter and the decision to install only one penstock at

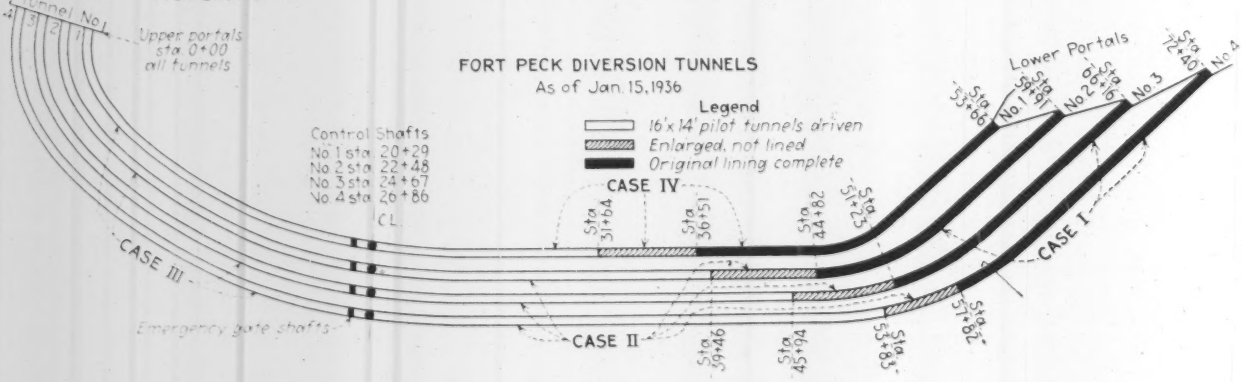
NEW DESIGN of the Fort Peck diversion tunnels.



CASE I
24" Inner Lining Inside of Original Lining—Tunnels 2, 3 and 4, Additional Work Downstream From Shafts

CASE II
45" Monolithic Lining—Tunnels 2, 3 and 4, New Work Downstream From Shafts

CASE III
36" Monolithic Lining—All Tunnels Upstream From Shafts



present require four types of lining in the redesign of the tunnels. These are noted as Cases I, II, III and IV in the accompanying drawings. To withstand the internal hydraulic pressure, which, under the old design, was resisted by the steel lining, the new design calls for electric welding of all joints and connections of the steel ring beams and purlin bracing used to hold the ground. The weight and spacing of the steel varies with computed ground pressures.

Studies are still under way on the final designs for the interior lining of Tunnel No. 1 downstream from the shafts (Case IV). This tunnel, functioning as a penstock, will be subject to greater internal pressure between the surge tank (control shaft) and the outlet at the power house. It is probable that a steel-plate lining, similar to that contemplated in the original design, will be placed.

In Tunnels 2, 3 and 4 a total length of 4,460 ft. had been lined to an internal diameter of 28 ft. 8 in. To bring these sections down to the new diameter of 24 ft. 8 in., a 24-in. reinforced-concrete inner lining will be placed (Case I). The additional lining will be placed in two parts—first the invert segment and then the remainder of the circumference.

Time will be required to alter the gantries, jumbos and other equipment used in enlargement work, to the new excavation size. Then, too, sufficient ring beams for large diameter are on hand to carry the enlargement of all four tunnels as far as the control shafts. It will also take some time to have the smaller-diameter ring beams fabricated and delivered. Rather than delay the enlargement work because of these factors, excavation of the four tunnels is being pushed ahead as far as the shafts on the basis of the old larger diameter.

The current enlarging work in Tunnels 2, 3 and 4, downstream from the shaft, aggregating 7,986 ft., will be lined with monolithic concrete of 45-in. minimum thickness, heavily reinforced (Case II). This thickness of lining will bring the finished diameter down to 24 ft. 8 in.

By the time enlargement work has reached the shafts in all four bores, equipment will be ready to proceed on an excavation diameter of 30 ft. 8 in. All the tunnels will be driven this size from the shafts to inlet portals, a total of 9,430 ft. The lining will be of 36-in. monolithic reinforced concrete (Case III).

The Fort Peck project is under the direction of Major Thomas B. Larkin, district engineer. Capt. A. W. Pence is in charge of the tunnel.

Estimating Patching Volumes by Roughometer

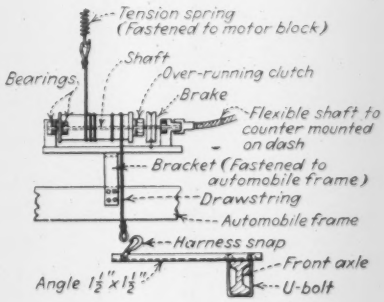
In limited use a new roughometer carried by automobile has given a useful indication of the volume of patching required to restore surface smoothness

By Arthur K. Erb
Formerly District Maintenance Engineer, State Road Commission, Bridgeport, W. Va.

HIGHWAY ENGINEERS, in their efforts to procure uniform smooth-riding surfaces on new construction, have gone to great lengths of refinement. Contractors in general have given this phase of the work their whole-hearted support and have perfected many devices without which these refinements would have been impossible. The trouble is that the roads do not stay smooth; in spite of all the care, research, soil studies and subsurface elaborations, the riding surface in time develops unevenness through causes too numerous to mention. When is a road rough and how rough? The obvious answer to this is some form of roughometer.

There were several of these devices available and they were of two general types: the kind that provides a sort of variable index and is attached to an automobile; and the buggy type designed to record the roughness on an invariable scale. It was decided that the type that lent itself most readily to the maintenance problem was the automobile type, but none of the kinds known seemed to be quite what was wanted. Hence the decision to design and construct one.

As pictured in the sketch, it consists of a cylinder on a shaft equipped with an overrunning clutch or "free-wheeling." The clutch shaft is connected by a flexible shaft to a counter mounted on the dash. The unit is mounted rigidly to the automobile frame. A draw-string connects the cylinder with an arm attached to the front axle, and the cylinder is provided with tension against the clutch and a brake to prevent overrunning the pull of the draw-string. When not in use, the draw-string is unhooked so that the mechanism operates only when required. The counter is of the setback type, and the unit is designed to record 1 for each half inch of indicated roughness.



ROUGHOMETER used successfully in measuring volume of patching required on roads needing surface repairs.

As a means of comparison, the indicated roughnes of new smooth concrete is between 15 and 50; good retread averages about 100, and new macadam between 100 and 200. The unit was used on two cars, a Hupmobile coupe and a Buick sedan, and after several check runs the correction was found to be as 230 is to 237, or 1x1.0343. This error is considered almost negligible because the errors arising from unavoidable changes in speed, weather conditions, tire inflation, etc., will probably average as much as 5 per cent. It is obvious that such of the above influences as can be controlled should be carefully checked at all times when readings are being taken. Our runs were made at 30 m.p.h., and tire inflation was checked each day.

The practical uses of this device may be extended beyond providing a rapid check-up on new construction and as a means of obtaining information as to the rate of failure of various surfaces. To the maintenance engineer it is most useful as a means of determining the amount of material necessary to provide a smooth-riding surface—in other words, how much to patch. Estimates of this kind of work are almost necessarily guesses, and it was the ambition of the writer to eliminate to some extent this highly undesirable factor. Unfortunately conditions permitted of only one season's trial of the method, but some benefit may be derived from the appended experience:

Type of pavement..	Conc.	Conc.	Conc.	Mac.
Average roughness index per mile before patching	454	410	530	460
Average roughness index per mile after patching ...	344	340	300	235
Cu.Yd. patching material per mile ...	52	33	185	115
Sq.Yd. patching per mile	2,340	1,500	4,000	3,335

Patching was done with Ameisite, Kyrock and poured patches, using quick-breaking emulsion and limestone chips, with the latter method predominating. The average depth of the patches varied widely, from ½ in. of Kyrock to nearly 3½ in. of Ameisite. The penetration emulsion patches showed averages between 1.24 and 1.95 in. All work was carefully done by experienced workmen, and straight-edges were used throughout to test for smoothness.

It is the belief of the writer that further development of the use of the roughometer in preparing quantity estimates of patching will soon provide maintenance men with reliable data upon which accurate estimates may be based.

Waterworks Operators Along Lake Michigan Tell of Winter Trouble

COLD-WEATHER experiences by operators of waterworks systems located on the west shore of Lake Michigan were outlined at the Racine meeting of the West Shore Water Producers Association on March 11. Features of these experiences were: an unusual number of frozen services, thawed electrically; little trouble with frazil ice in the intakes; a few broken mains due to frost movement of earth; general acceptance of thawing costs by the water departments; and minor troubles in filter plants. Related winter problems were covered by a paper on methods of maintaining construction activities on the Milwaukee filtration plant.

Reporting on frozen services, J. C. Zufelt, for Sheboygan, Wis., stated that 55 services had frozen, all thawed by the department. Several hydrant leads had been sheared off. After thawing services, the meters were removed and a nipple and orifice disk were substituted so that water might run continuously without excessive waste. Milwaukee, said H. P. Bohmann, had few mains frozen but experienced sixteen minor breaks, 84 hydrants frozen out of 79,000 and 700 meters frozen out of 10,000. The fact that only 10 services froze out of 134,000 was due, he said, to the fact that Milwaukee insists on burying pipes 6 ft. deep. Walter A. Peirce, Racine, had a record of 200 frozen services out of 15,000, but expected that several more would be reported when word got around that the department would stand the expense. In Kenosha J. W. Meyers has thawed 414 services out of 10,700 in the city. The services are supposed to be laid 6 ft. deep, but plumbers on occasion raise the depth inside the curbs. Freezing usually occurred under sidewalks from which snow had been repeatedly removed. One service had been thawed nine times, one six times, five five times, ten four times, 25 three times and 52 twice.

Frost penetrates to 5-ft. depth

In Waukegan the department thawed 60 services at $6 each, said L. C. Domke, but private welders cut in on the profitable business, charging $15 each, or $6 per hour, so that the total number frozen is not available. Frost penetrated 5 to 5½ ft., said J. J. Craig, of Zion, and only one of the 850 services froze; as no thawing equipment was available, the service was dug up.

George B. Prindle, Highland Park, outlined trouble with frazil ice closing the inlets to both of the city's intakes; they were finally freed when a 23-ft. negative head was put on the intake line by drawing down the pump well. Closure of a little-used road to the plant following a heavy snowfall caused a shortage of fuel oil. J. C. McNichol, Lake Forest, had 18 frozen services out of 2,000. E. L. Pflanz, Glencoe, had 55, all thawed out by private contractors. H. M. Lay, Kenilworth, had twelve out of 800 frozen services thawed by electrical contractors at $15 each. The village is considering payment of one-half the cost, since it is considered that 50 per cent of the freezing was probably in the streets. In Wilmette, G. S. Noerenberg reported 72 out of 3,700 services were frozen. The village does not assume responsibility for thawing, which costs $15 per service. Evanston, said W. W. Polk, had 75 out of 10,000 services frozen, one frozen main and one broken main. Chicago has had about 8,000 frozen services and ½ mile of frozen main in sandy soil.

Michigan City, said Mr. McAlpin, has had 375 of 5,300 services frozen. Notice to consumers in the newspapers from the water department to let the water run boosted consumption from 2.5 to 7.5 m.g.d. The city pays for thawing services once, and the consumer for subsequent thawing. Originally the public utility company that did the thawing electrically charged $15 per service, but after 300 had been thawed the price was reduced to $10 each. Four hydrants were frozen. Mr. McAlpin reported water passing to gas mains after a service line had been thawed; investigation disclosed that a water and gas main had been fused together and an opening melted between the two.

Leon A. Smith reported for Madison, Wis. (not on Lake Michigan) that 125 services out of 14,000 had been thawed out at a cost of $8 each, which expense the city stood. It is the intention to survey all services and the depth to each service this summer, then to notify the consumer to lower it if the depth is found to be less than 5½ to 6 ft.

L. F. Warrick, sanitary engineer, Wisconsin state board of health, stated that the cold weather had created no health hazards; in fact, the supplies have been exceptionally good. Typhoid cases in the state during 1935 were 113, compared with an annual average of 188 for the preceding six years. There were but eight deaths in 1935 from typhoid. The infiltration gallery water supply for Niagara, Wis., froze up completely, he reported. An emergency connection was made after a few days to a supply of a near-by paper and pulp mill.

Winter work at Milwaukee

Herbert Schmitt, assistant engineer in charge of construction, described winter work on the Milwaukee filtration plant. When ice had formed 8 to 10 in. deep on large newly built 400x400 ft. sedimentation basins, which had been filled to within 18 in. of the top, experiments with a 40-hp. boiler in trying to keep the space over the top of the water warm were entirely ineffective beyond a radius of 20 to 30 ft. Emptying the basins was not feasible as work was going on in drainage channels. A 36-in. pump was obtained, and water was discharged over the top of the basins into the lake. After a 5-in. drawdown the ice broke away from the columns and walls, leaving an 18-in. irregular ledge, thus preventing undue side pressures. The process was repeated three times. Since Nov. 8, 1935, 10,500 cu.yd. of concrete has been placed, much of it under severe conditions. The concrete is mixed in a central mixing plant 5 miles away, where aggregate must be heated. The concrete must reach the forms at between 70 and 100 deg. F. Actually the records indicate it ranged between 75 and 90 deg. Examinations disclosed no more cracks in the concrete poured in cold weather than in mild-weather concrete. More than 100 tons of hay were used to cover concrete—this demand raised the price of hay in Milwaukee $1 a ton.

Equipment troubles during the coldest weather included snapped bull wheels on steam shovels and many broken truck axles, which led Mr. Schmitt to inquire as to how many broken gate frames and valve stems might be found. In conclusion, he warned that if a contractor could not be easily induced to do good work in fair weather, one should beware of undertaking construction in below-zero temperatures.

Newly elected officers of the association are as follows: chairman, J. C. McNichol; vice-president, L. C. Dompke; secretary, George B. Prindle; recording secretary, Oscar Gullans; treasurer, J. W. Myers, Jr.

Power Maps Published

The Federal Power Commission has issued two maps relating to the power plants and electric utility systems of the country. Map No. 1 gives the service areas of 57 major utility systems and eight large municipal systems, each being separately identified by distinctive color and pattern designs. Map No. 2 gives the principal generating plants and the electric transmission lines covering in all 345 hydro-electric plants and 709 steam stations, also 135,000 circuit miles of transmission lines. Both maps are to a scale of 1:2,500,000 (1 in. equals 40 miles), and are about 50x80 in. in size. No. 1 unmounted, sells for $7.50 and No. 2 for $5. Mounted on linen, the maps sell for $10 and $7.50 from the Federal Power Commission, Washington, D. C.

Practical Soil Mechanics at Muskingum—I

By Theodore T. Knappen and Robert R. Philippe
Chief, Engineering Division, and Director, Soils Mechanics Laboratory, U. S. Engineer Office, Zanesville, Ohio

THE END of empirical methods in earth-dam design is predicted by the record of the soils-laboratory work described in the series of articles begun in this issue.

By analyses and model tests the engineers of the $40,000,000 Muskingum River flood-control works are adapting soils of widely different geological character to earth-dam construction with a close approach to predetermined exactness. This is the most notable advance in the practical application of soils mechanics in dam building since the remarkable work of R. R. Proctor described in *Engineering News-Record*, Aug. 31 and Sept. 7, 21 and 28, 1933.

With the work done at the laboratory of the Muskingum project, empiricism has been further pushed from a dominating position, and the design of earth dams is brought near to the realm of rational determination.

In this and three succeeding issues the story of the laboratory is told by the engineers who put their faith in the helpfulness of soils mechanics and whose efforts have been rewarded by increased certainty and economy in design and construction.

Groundwork for a Rational Study

THE PROBLEM of earth-dam design for flood control in the Muskingum River Valley roots deeply in the geology of the drainage area. In the north and west there is a glaciated zone of moraine deposits; and a middle zone of glacial outwash materials follows to the Allegheny plateau in the southeast, where residual soils are dissected by deeply eroded valleys that have been filled with poorly consolidated silts, clays and sands. These different geologic sources give a large variety of soils both in suitability for dam embankment and for embankment foundations. The dams are located in all zones, each of which presents a general soil condition with a specific soil condition at each location. Referring to Fig. 2, a survey shows situations as follows:

1.—The Mohicanville, Charles Mill, and Pleasant Hill dams are founded on materials that were laid down by the glaciers, to a large extent, and have foundations that are both reasonably strong and reasonably impervious. There is one exception to this, where a recent fill of unconsolidated silt had to be removed from the foundations at Charles Mill. These three dams are located in the glacial region. Although the main structures from a soils standpoint are relatively simple, several smaller structures had to be founded on recent deposits of peat some 20 ft. thick and were among the most difficult of our problems.

2.—The Bolivar, Beach City, and Mohawk dams are located in the glacial outwash region, a band along the southeastern boundary of the glaciated region. The characteristics of these foundations are very pervious clean sands and gravels some 100 to 120 ft. deep in the valley floor, overlain by a very thin and in places quite pervious layer of sandy silt. The planning of these embankments was controlled by the magnitude and effect of the seepage, which had to be determined, with provision made to protect the fill against its destabilizing influence.

3.—The other earth dams in the project are located in the Allegheny plateau country and have foundations consisting of unconsolidated silts and clays of depths varying from 5 to 70 ft., in most cases underlain by fine sand or other stable deposits. These conditions, generally speaking, presented the problem of the stability of these foundations under the embankment loads, although some consideration had to be given to effect of seepage where the overlying silts and clays were comparatively shallow. Leesville, Tappan and Clendening dams are in this class, while the Piedmont dam and also the Senecaville dam presented problems in stability alone. Wills Creek dam presented both problems, in that one portion of the embankment rested upon a pervious sand and gravel terrace, while the remainder rested upon secondary fill of silt and clay filling the present stream channel.

With conditions as described, a preliminary soils reconnaissance was indicated as the first operation in dam planning after general location determined by degree of effectiveness for

FIG. 1—IN THE SOILS-MECHANICS LABORATORY of the Muskigum flood-control project, different sizes of hydrometers are used to assure accurate determinations at different densities. Soil classification is determined by both sieves and hydrometers.

flood control had been decided. The reconnaissance very soon made it apparent that diverse problems of extreme gravity would be presented for decision. It was apparent that the unconsolidated silt and clay foundations could fail from resulting excessive shear stresses induced by the proposed embankment loads, such as developed in the construction of the Lafayette Dam (*ENR*, Sept. 27, 1928 and such as are a familiar occurrence in the construction of the high levees on the lower Mississippi River. Should a failure of this type occur, it was realized that it would probably mean the abandonment of the site, resulting in a tremendous money loss. On the other hand, unless a definite basis for design could be developed and applied, the cost of the structure, if designed to be unquestionably safe, might be unnecessarily high.

Two of the dams proposed for construction on pervious foundations were very high structures; one, the Mohawk Dam, 115 ft. high, is probably the highest ever proposed on a sand and gravel foundation. To proceed, therefore, without a previous knowledge of the foundation behavior of such structures after completion would be unwarranted. Again the embankments themselves were to be constructed of diverse materials. The excavations for spillways, outlet structures, etc., at various sites ran into millions of yards, and (for economy) had to be utilized wherever possible. A thorough knowledge of the behavior of all the materials available for use in the embankment was essential to the proper planning of the work and the preparation of specifications for its execution.

It was apparent then in the very first stages of the project that only by a thorough-going application of the latest developments in soil mechanics and by conducting additional necessary research to amplify the results so obtained could the dams be designed safely and economically. This called for a soils laboratory and made it clear that it must be equipped: (1) for the rapid analysis and classification of soils, to lay the basis for the determination of further investigations; (2) for the determination of permeabilities of undisturbed and remolded samples of foundation and embankment materials respectively, with proper facilities to apply this information to the specific problem at hand, principally by the use of model studies; (3) for the determination of the consolidation and shearing characteristics of undisturbed samples of foundation materials and, to some extent, of remolded samples of proposed embankment materials; and (4) for the investigation of the consolidation characteristics of embankment materials and the moisture requirements necessary for control in placing them.

With the laboratory in service, preliminary soil studies were begun in field and laboratory to obtain sufficient information to determine the feasibility of constructing a dam at a particular site and to determine the probable design requirements to insure stability of the embankments, including sufficient information about excavations and foundations for all proposed structures to permit the preparation of a preliminary design for estimating purposes.

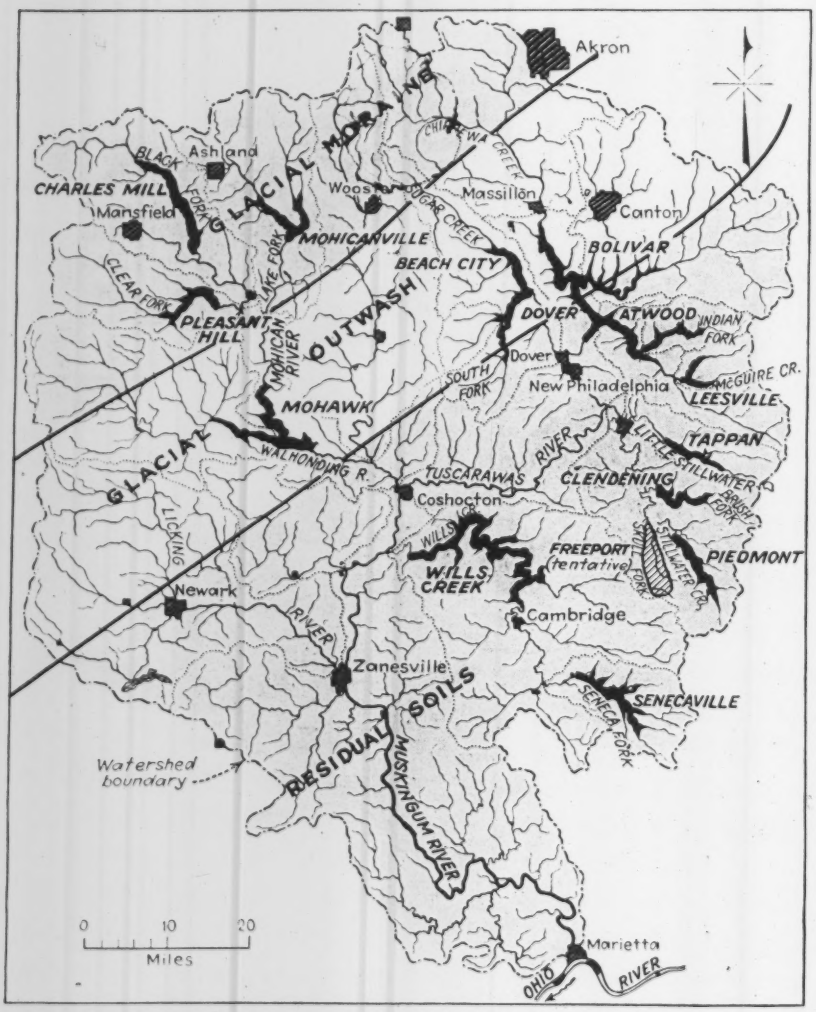


FIG. 2—DETENTION DAM LOCATIONS are fairly evenly divided between the glacial morain, glacial outwash and residual soil zones into which the Muskingum Valley drainage area is divided.

Field sampling first task

Contracts were let for obtaining drive samples of the overburden and core borings at the various sites. The number of borings was such as to permit the general development of a geologic section. Usually two or three borings were undertaken across the valley floor and about the same number in each abutment. The samples of the overburden were obtained by drive tubes driven below the bottom of the casing between the operations of driving the casing and washing out the excess material. Core borings were taken in rock with a double-barreled drill equipped with diamond or metal alloy bits. As the characteristics of the site, developed by detail studies of these preliminary borings, indicated its probable inclusion in the final plan, the scope of the investigation was widened to include further borings to develop spillway locations, detailed data on outlet structures, more exact information on possible borrow-pits and further data on the valley-fill materials.

Numerous borings were taken by hand augers in the excavation and borrowpit areas under consideration. Samples in 5-lb. sacks as well as 1-lb. samples in sealed jars were secured from these excavations for later use in remolded tests, in addition to classification work, to fix the general characteristics of such borrow-pits. Hand-auger borings were also used to investigate, in detail, the extent, depth and general characteristics of natural blankets in the valley bottoms which help to seal off the more pervious layers below. The samples placed in sealed jars were to provide specimens for water-content determination.

As the studies on any site progressed,

it became necessary to obtain undisturbed samples of the foundation materials. These samples were of two general types: those obtained for permeability studies, and those obtained for consolidation and shearing tests. In the first class, it is not necessary to get the sample to the laboratory with its original moisture content, but it is necessary to get the sample in an undisturbed condition. With the second class of sample, the material has to be undisturbed and its water content unchanged when it reaches the laboratory. This made it necessary to seal these samples in paraffin immediately upon taking them on the job. Both of these types of samples were taken by excavating test pits in the foundation of the proposed embankment.

Soils classified in laboratory

Preliminary soil classification in the Zanesville laboratory consisted of moisture-content determination and grain-size analysis. These two factors taken together give a rough picture of the type of material and its probable behavior. The grain-size analysis alone does not give any information on the probable degree of consolidation of the material, but in a saturated material, knowing the grain size, the water content gives an excellent indication of the stability of the material. Water content is, of course, also valuable to determine the suitability of the material for direct use in embankment.

As soon as a sample was received in the laboratory, it was taken to the classification desk, where a soil technician took a small sample from the sealed jar and placed it in a watch-glass set. This sample was then weighed, dried in an electric oven at a temperature of 98 deg. C. and weighed again. From these, knowing the weight of the glass, the weight of the water content and the dry weight of the sample can be determined and the moisture content in terms of per cent of the dry weight computed.

The next step was to determine the grain-size classification for the material. A well-trained technician can generally classify the soil closely, but frequent analyses (about one sample in ten) are necessary as checks and to provide representative curves for further study.

Soil classification is handled by sieve analysis, by hydrometer analysis or by a combination of the two. Fig. 1 shows the hydrometer table and various sizes of hydrometers for accurate determinations at different densities. The grain-size distribution often requires a determination by a combined method of analysis. The soil to be so tested is first washed through a 200-mesh sieve; that portion retained is analyzed by sieves and the porion washed through by hydrometer. It is not necessary to make the wash thoroughly, but only to remove fines enough to prevent caking of the sieve sample while drying and allowing the sieves to complete the separation, taking care to add to the hydrometer test the remainder passing the 200-mesh sieve. The combined analysis is a check on both methods of analysis, for the resulting grain-size curve plotted characteristically on semi-log paper should result in a smooth curve joining at the break of method. The soil classifications used are illustrated by the diagram Fig. 3.

Tentative design now possible

The completion of the soil classification from the available samples, determination of the water contents for each, along with the informaion on the rock determined by the geologists from the study of the rock cores, permits the preparation of a geological cross-section along the center line of the proposed embankment. In addition to this, in some cases it was found necessary to prepare geological sections normal to the axis of the dam at various locations and also sections along proposed spillway and outlet routes.

As the next step, a preliminary design of the embankment is prepared. The preliminary design of the embankment will ordinarily contemplate he use of all suitable materials available in required excavations and will supplement these with the best available borrowpit materials for the embankment design indicated at the site. At this stage the proposed embankment section can be added to the geological sections, and since the final stability of the structure is being investigated the foundations and embankment must be considered from now on as a unit. All investigations are directed to determination of stability from the standpoint of seepage and strength, with this in mind.

These studies may show that it is necessary to change the design of the embankment by providing flatter slopes or more adequate drainage, or that it may be necessary to change the condition of the foundation by providing a blanket to connect with the impervious section of the embankment and extending upstream from it to insure an adequate ratio between path of percolation and head. It may be necessary to alter the condition of the foundation by removing certain materials, under all or part of the embankment, which are too impervious or too weak to permit of economical treatment by any other method. The foundation condition may be altered by the inclusion of concrete, steel sheetpiles or earth cutoff provisions. But from now on, the embankment and its foundations together must be considered as a unit for study.

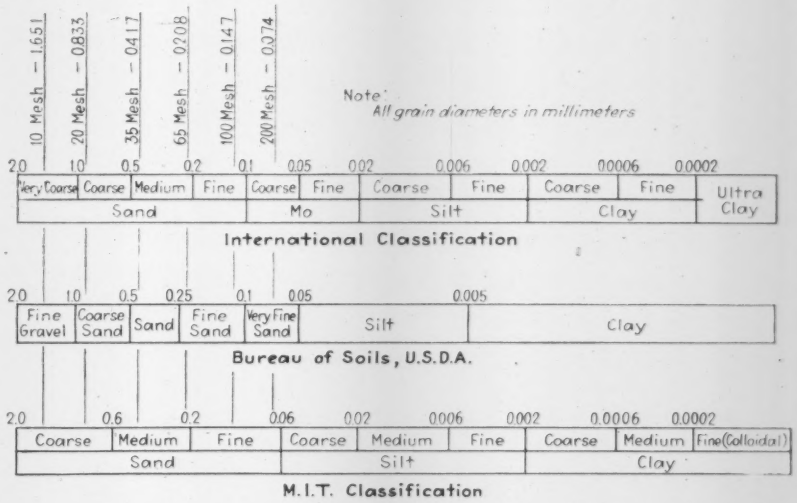

10 Mesh = 1.651
20 Mesh = 0.833
35 Mesh = 0.417
65 Mesh = 0.208
100 Mesh = 0.147
200 Mesh = 0.074
Note: All grain diameters in millimeters
2.0 1.0 0.5 0.2 0.1 0.05 0.02 0.006 0.002 0.0006 0.0002
Very Coarse Coarse Medium Fine Coarse Fine Coarse Fine Coarse Fine Ultra Clay
Sand Mo Silt Clay
International Classification
2.0 1.0 0.5 0.25 0.1 0.05 0.005
Fine Gravel Coarse Sand Sand Fine Sand Very Fine Sand Silt Clay
Bureau of Soils, U.S.D.A.
2.0 0.6 0.2 0.06 0.02 0.006 0.002 0.0006 0.0002
Coarse Medium Fine Coarse Medium Fine Coarse Medium Fine(Colloidal)
Sand Silt Clay
M.I.T. Classification

FIG. 3—THE THREE SOIL CLASSIFICATIONS in general use; comparison of the results of a soil test are shown by the grain-size figures.

Further studies may develop the need for additional field explorations to provide all the required data, the purpose being to determine:

1. The characteristics of the proposed dams and foundations as to permeability and seepage and their safe design to resist piping and sloughing.

2. The characteristics of the foundation material as to amount and rate of consolidation, shearing stresses induced by embankment load and resistance strength of the foundations.

3. The suitability and use for embankments of materials from excavation and borrowpits.

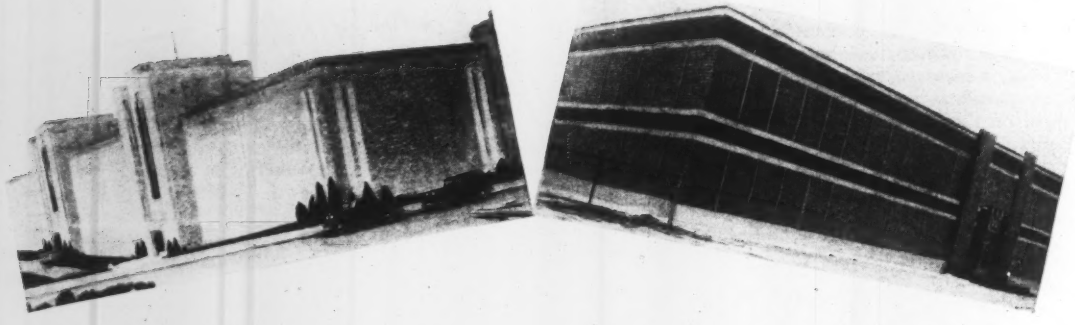
The development of equipment and methods for making these determinations is described in three following articles.

* * *

The next article, to appear April 9, describes methods of conducting the permeability and seepage studies, which brought out the important fact that an upstream blanket was often more effective and economical than a corewall in reducing seepage.

Industrial Buildings—IV

Windowless Offices for Industry



Two new industrial buildings embrace the theory of the solid wall, one using masonry, the other glass block—Both incorporate the most modern air-conditioning and lighting

AMONG THE PROPOSALS that are advanced from time to time to change conventional building practices, none is more intriguing than the windowless wall. It is a relatively recent idea, for only with air-conditioning and superior lighting is it tenable at all. The facility with which artificial atmosphere may be created and artificial illumination installed and their actual scientific superiority over natural air and light provide the basis for the solid wall building. But an inborn or long-developed human liking for windows still stands as an obstacle to be overcome. And it is only rarely that an owner has the desire or the courage to disregard it and build a windowless wall building.

Two such buildings recently completed are, therefore, structures of note. One is an office building and printing plant of the Hershey Chocolate Corp., the other an office and research laboratory of the Owens-Illinois Glass Co. The Hershey Building uses solid masonry walls making 24-hour artificial illumination a necessity. Translucent glass block walls that admit as much or more light than windows (because of the relatively larger area of glass) are used on the Owens-Illinois Building. What these structures mean in terms of future building trends is anyone's guess. What they are structurally, mechanically and electrically is presented in the following.

Masonry Walls Without Windows

BOLDLY putting theory into practice, the Hershey Chocolate Corp., of Hershey, Pa., has built a windowless building to house all of its office force and a printing plant. In the three stories and basement of this structure, which is 151 ft. wide and 350 ft. long, Hershey employees will work under the best weather and lighting conditions that science can supply, which is to say better than nature has ever been able to provide.

Windowless buildings have been much discussed but seldom built. Consequently the officers of the company had little precedent to guide them in their decision to dispense with windows. In Fitchburg, Mass., the Simmonds Saw & Steel Co. has a one-story medium-size factory without windows, built about four years ago. In Wallingford, Conn., the Wallingford Steel Co. built some time later a small office building, 30x60 ft. in plan, two stories high. And there are a number of store buildings that get along with solid walls. The latter offer no fair comparison with the requirements of a large office and factory. The Fitchburg and Wallingford buildings, while somewhat better in this respect, are relatively small, and experience with them has been limited.

In one sense, therefore, the Hershey Building is a theory expressed in stone, concrete and steel. So far as the officials of the company can see, the theory has sound scientific basis in all but one respect—namely, the psychological. Will people be content to work in a windowless building? Admittedly no conclusive answer can be made until the building has seen more service. The officials have convinced themselves that they will personally like to work in it and, in so far as the office and printing-plant staffs are concerned, the officers are counting on approval of the pleasant and highly improved working conditions that are provided. If a windowless building can be a success in a town of 2,500 population in the foothills of the Alleghenies, where sunlight and fresh air are abundant, it will unquestionably challenge attention elsewhere.

General planning

The idea for a windowless building grew solely out of lighting considerations. A new office building was required on a site immediately west of the chocolate factory. This site was 350 ft. long, and some 180,000 sq.ft. of floor space was required. The long east wall of the building was to adjoin the factory, so that sunlight could penetrate only from the west, south and north; if any light were to reach the east wall, the

building would have to be narrow, at most 50 ft. This meant a nine-story building, which was inappropriate in Hershey. Also elevators, except in the printing-plant portion, were not deemed necessary, so that the height was limited on this score to not more than three stories and a basement, or four stories in all.

A four-story building, to provide 180,000 sq.ft., would have to be 150 ft. wide, with artificial lighting for two-thirds of its width. Why not, therefore, 100 per cent artificial light and, in that case, why any windows? Air-conditioning winter and summer was desired, and windowless walls could be made and kept airtight more economically than walls with windows. This was the reasoning that brought the windowless building into existence.

One concession is made to counteract the possible psychological reaction against blank exterior walls. This is an electric signalling system or weather-vane, which will be installed in each office. This apparatus will consist of a small brass panel placed near the electric clock. Three lighted buttons in red, white and green on this panel will furnish seven different combinations of signals, each corresponding to an outside weather condition.

Structural plan

Two types of structure comprise the building. In the office portion on the front half of the plot a structural-steel frame with structural gypsum and concrete-fill floors is used. The north or back half of the building is of reinforced concrete with flat-slab floors. The office floors are designed for a live load of 50 lb. per sq. ft., the flat-slab floors for 250 lb. per sq. ft. The high live load in the reinforced-concrete portion will take care of a relatively heavy printing-plant load and any storage that is required; the presses, however, will be located in the basement.

In the office-building portion, which is the subject of this discussion, the girders, 24-in. wide-flange sections, run in a transverse direction and are spaced about 21 ft. on centers. Framing between the girders is composed of 14-in. beams on about 7-ft. centers, which support the precast gypsum floor arches. These are made up of 12-in.-wide beams of gypsum reinforced with structural members that project beyond the gypsum to provide support on the steel floorbeams and project above to furnish bond and anchorage for the concrete fill. The precast gypsum beams are set on 30-in. centers, and gypsum filler slabs are placed between them to complete the floor. The structural gypsum floor is 3½ in. thick, and with concrete fill and finish the total floor thickness is 6 in. It weighs about 60 lb. per sq.ft. The members of the structural frame are also fireproofed with precast gypsum.

The walls of the building are of native limestone, a large part of which was taken out of the foundation excavation; a small amount of Indiana limestone trim is used. Walls are 20 in. thick, of self-supporting type. Wall columns are used in both the steel and reinforced-concrete portions of the building. The roof is a level concrete deck on which the drain pipes protrude 2½ in., since it is planned to maintain a sheet of water on the roof at all times, to act as an insulator.

Throughout the building, unusual care has been exercised to provide adequate insulation and acoustical treatment. The masonry walls are lined on the inside by 4-in. clay tile separated from the walls by a 1-in. air space and plastered. The concrete roof deck, in addition to an asphalt covering and the sheet of water, is lined on the inside by 1½ in. of cork, plastered on the lower side. The better the insulation, of course, the more efficient will be the operation of the air-conditioning system.

Since there will be no windows, the matter of acoustics is of major importance. In the ordinary building where considerable noise enters through the windows, minor interior noises go unnoted. This will not be the case in the windowless building, and sound-absorbing materials must be used extensively. All of the ceilings are treated with cork slabs 1½ in. thick attached to the gypsum slabs forming the structural floor. In the rooms where office equip-

FIG. 1—SOLID WALLS of Hershey Chocolate Corp. Building are relieved by glass panels illuminated at night. Office portion of building is shown complete with work continuing on printing-plant section at rear.

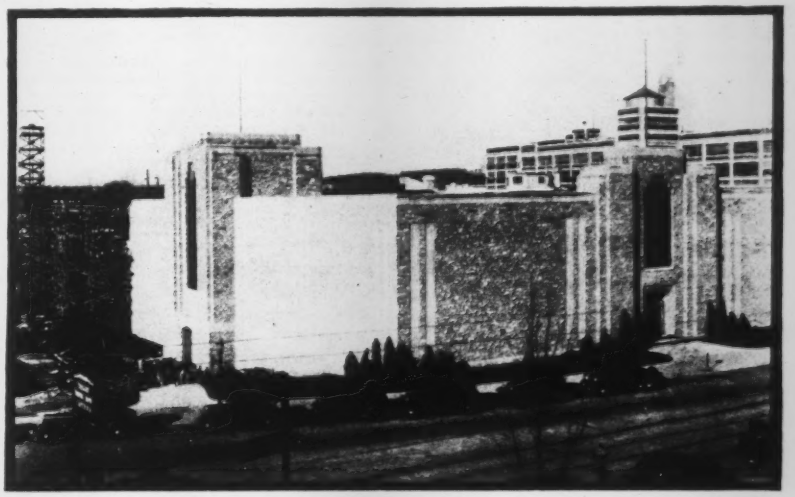


FIG. 2—AIR DUCTS carried in false beams in one of the large office rooms. The steel columns are furred out to suggest reinforced concrete.

ment machines will be operated, the walls are treated with acoustic plaster.

Lighting

The windowless building requires superior lighting, and this has been provided in the Hershey Building by an elaborate layout of fixtures containing both mercury vapor and mazda units. This combination assures a complete spectrum with color characteristics approaching those of sunlight, since the mercury vapor supplies the violet and blue colors in which the mazda lights are deficient, while the necessary orange and red are supplied by the mazda lights. The lighting is designed for 20-ft. candles on the working plane.

Each lighting unit contains a 30-in.-long 300-watt mercury tube in the form of a circle and a 750-watt mazda lamp. The unit, of which there are 158 in the building, is designed to reflect 95 per cent of its light from the ceiling, while 5 per cent is directed downward through frosted glass to eliminate any shadow from the unit itself. The cork ceilings are painted an ivory color to give them a reflecting value of 75 per cent of the incident light.

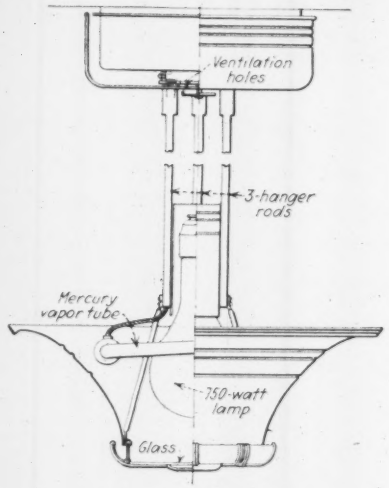
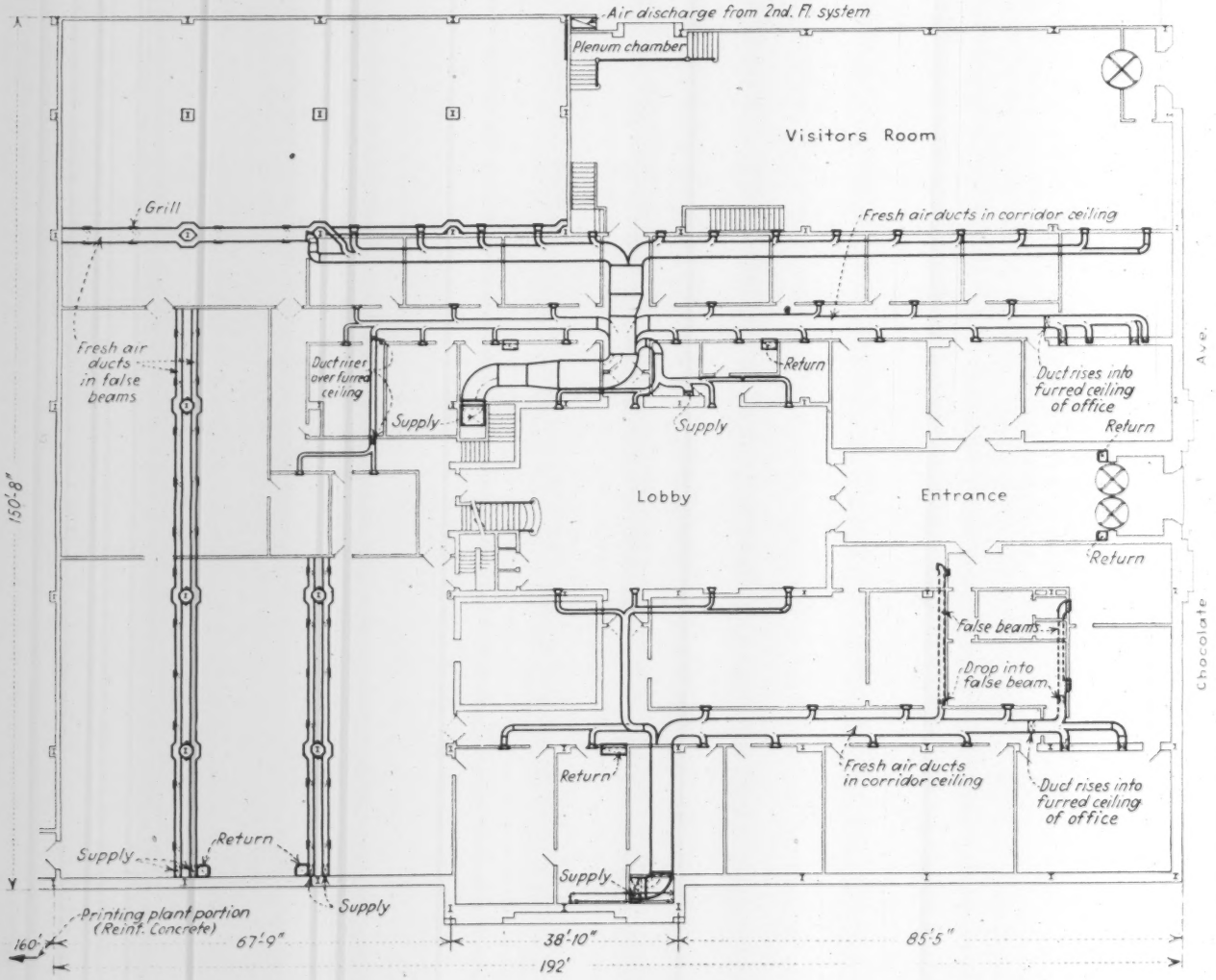


FIG. 3—LIGHTING UNITS that produce a synthetic daylight combine a mercury vapor tube and a mazda lamp.

FIG. 4—AIR-DUCT LAYOUT for second or street floor of the Hershey office building. In front half suspended ceilings in the corridors hide the ducts, while in large rooms in the rear the ducts are placed in false beams along the column lines.

In the corridors a special lighting requirement had to be met. Mercury vapor units are too large to be used in such small spaces, and mazda lights would have provided too great a contrast with the synthetic daylight in the offices, which are separated from the corridors only by clear glass partitions. The solution is a dome fixture containing a 150-watt mazda bulb, with a blue-colored glass placed below it. While this reduces the efficiency of the illumination, it improves the color tone, which is the desired result.

The problem of façade treatment is another problem that must be met by the designer of a windowless building. At night particularly there is the danger that it will look like a storage warehouse. The Hershey Building designers recognized this by installing double-glass panels 36 ft. high on the front and side elevations. Some 400 15-watt lamps are used in each panel, placed behind opal diffusion glass in turn covered with flashed amber glass, which creates an amber glow on the building.



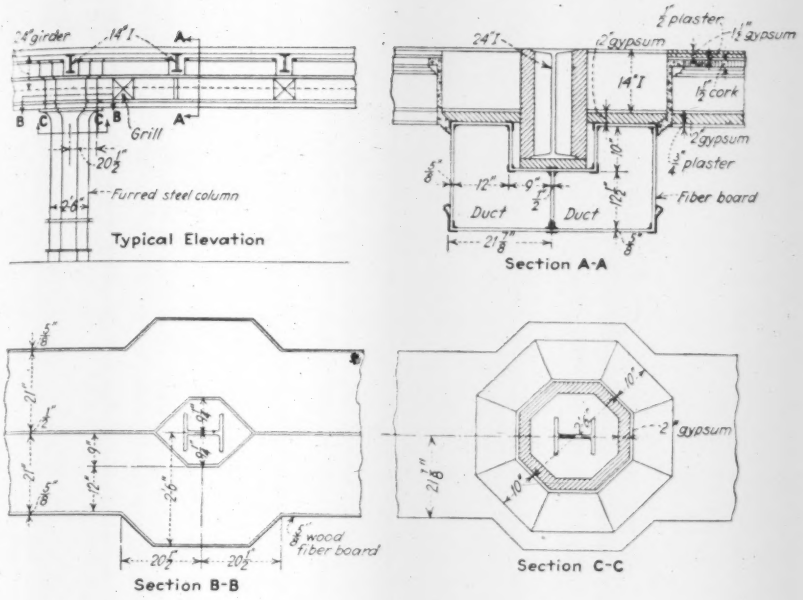


FIG. 5—FALSE BEAM AND COLUMN DETAILS adopted as an expedient to hide the unsightly air ducts.

An illuminated clock over the entrance also serves as a part of this decoration.

Air-conditioning

Finally, and of comparable importance to the lighting in a windowless building is the air supply. In the Hershey Building an air-conditioning system has been installed that will assure year-round control of both temperature and humidity. Refrigeration in the office portion is provided by a 135-ton machine, and there is a similar machine for the rest of the building.

The design provides for a temperature differential of 10 to 15 deg. between inside and outside in summer and a relative humidity of 50 per cent; in winter the humidity will be lowered to 45 to 48 per cent. A complete system of fans, air ducts, grills and accessory equipment insures circulation of conditioned air at the rate of 90,000 cu.ft. per minute. All of the compressors and refrigerating equipment are located in the basement, as are the fans and air washers except for the top floor; the air washer and fan for this floor are placed in a penthouse, and the air-distributing ducts are run over the top of the roof to inlets into the discharge ducts over the third-floor ceiling.

In the office-building portion, extra care was used in locating and masking the air ducts so that their appearance would not be objectionable. The second or street floor of the building is divided into two parts by a large central lobby. These two parts are in turn bisected by lengthwise corridors, along either side of which the individual offices are located. Conditioned air is brought in through a duct hidden by suspended ceilings in the corridors and enters the offices at either side through grills located just below the molding. The vitiated air passes out of the offices through grills in the lower part of the doors, and the corridor itself acts as a return duct, the air being drawn through large wall grills at one end of the corridor, which lead to the return ducts.

The above arrangement is adequate for the small offices that line either side of the corridors, and it is to be noted that the grill inlets and outlets are the only visible evidence of the air-conditioning system. However, in the back part of the second floor and in the front and back of the third floor there are large open rooms. The second-floor layout is shown in Fig. 4; on the third floor the rooms are much larger—65x150 ft. in both the front and back of the building. In these large areas it was necessary to have more air entrances than could be supplied along the walls and there were no corridors in which the ducts could be hidden. Consequently an arrangement was worked out whereby an air duct is hung either side of the girders. These ducts and the girder are enclosed in a furring of wood-fiber board, and being located on the column lines have the appearance of broad shallow concrete beams. Ducts were not required on every column line, but the same false beam furring is used throughout all the large office areas.

To carry the illusion further, the structural-steel columns are built out to an octagonal section by a furring of gypsum blocks and are provided with flared capitals, to correspond in size with the wide false girder on top. Large openings in inconspicuous corners of the room lead the vitiated air from these large areas to the return ducts.

Administration

The structural and architectural elements of the Hershey Building were designed by R. Paul Witmer, of the Hershey Lumber Co. All other work was handled by A. Bowman Snavely, head of the engineering department of the Hershey Chocolate Corp. The air-conditioning layout was designed and installed by the York Ice Machinery Co., York, Pa., and the lighting by the General Electric Vapor Lamp Co.

No Windows But All Glass

THE SOLID-WALL BUILDING is exemplified in a quite different form from the Hershey Chocolate Co. office by the new building of the Owens-Illinois Glass Co. at Toledo. Thus if windows are something to look through, the latter building is also windowless, but if windows are merely for the admission of light, then the Owens-Illinois walls are all windows. Glass blocks explain the paradox. In this 102x142-ft. building, part two stories and part one story, some 80,000 of these hollow blocks are used in the exterior walls and partitions. Manufactured with ribbed or prismatic faces, the blocks admit diffused and glareless sunlight during the day and at night contribute a distinctive appearance when the interior lights are on. The blocks also have a high insulation value and thus contribute to the efficiency of the air-conditioning system, being aided in this by fibrous glass insulation installed in pads under the roofs; similar but thinner pads are also utilized as acoustical ceilings in some of the rooms. The building was completed and occupied on Feb. 1 by the office staff and research workers of the company's packaging research division.

The use of hollow glass blocks for exterior walls is a relatively new development. Although they have had rather wide acceptance for partition walls and other interior architectural uses, the difficulty of providing a suitable bond with mortar has resulted in indifferent success for the blocks in exterior work. The block used in the Owens-Illinois Building is a new product which overcomes this disadvantage by a sanded adhesive coating applied to the laying faces during the manufacturing process. Shear and tension tests of mortar bond at Purdue University gave values of 52 and 16.3 lb. per sq.in., respectively; in all cases the failure oc-

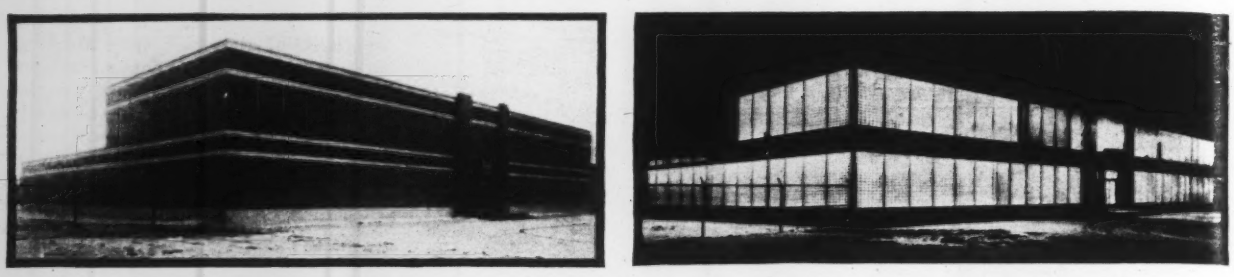


FIG. 6—BY DAY OR BY NIGHT the new glass-block building of the Owens-Illinois Glass Co. sets a new style in industrial architecture.

curred between the sand coating and the glass, but the values are high enough to meet all current specifications and provide efficient weathertight joints.

The blocks are manufactured as two glass dishes of uniform wall thickness whose edges are dipped in molten metal and then pressed together while hot, to form a hollow unit. Available in several sizes, a $4\frac{7}{8}$x8x$3\frac{7}{8}$-in. block with vertical ribs on the outside and horizontal ribs on the inside is used in the Owens-Illinois Building. As a prelude to their adoption for exterior wall use, an extensive series of tests was made at Purdue University, some of the results of which are abstracted below.

Compression Tests—Single blocks, tested in compression with a gypsum cap, cracked first at 1,078 lb. per sq.in. and carried a maximum load of 2,036 lb. per sq.in. With a cement and plaster of paris cap, the first crack occurred at 685 lb. per sq.in., and a maximum load of 828 lb. per sq.in. was carried. These are averages for six blocks. Piers five blocks high with $\frac{3}{16}$-in.-deep rodded mortar joints (1 part masonry cement and $2\frac{1}{2}$ parts sand) cracked first at 405 lb. per sq.in. and carried a maximum load of 478 lb. Panels three blocks wide and nine blocks high gave crack and maximum load values of 325 and 400 lb. per sq.in., respectively; there was little difference whether the joints were deep rodded or flush.

Lateral Strength—Panels about 7x8 ft. in size, held between brick piers and sills, were subjected to lateral pressure through an inflated bag held against the wall. There was no visual failure until a pressure of 120 lb. per sq.ft. had been attained, after which the panel failed by shearing of a joint near the top. Deflection at the center of the panel was about $\frac{1}{4}$ in. A steel sash panel of the same size deflected $\frac{1}{4}$-in. for only 5-lb. pressure.

Heat Transmission—Conclusions as to the insulating value (based upon a panel containing 190 sq.in. of glass and 26 sq.in. of mortar) were that the glass block transmits 69.3 per cent less heat than steel sash, and that it does not permit inside surface condensation when subjected to ordinary temperature and humidity conditions. Also, that the glass-block wall is equivalent in insulating value to a 16-in. plain brick wall, an 8-in. brick wall furred with wood lath and plaster and a 16-in. concrete wall furred with lath and plaster. The tests also showed that the block has an average coefficient of heat transmission of 0.29 B.t.u.'s per sq.ft. per hour per degree difference in temperature F.; walls of 8-in. solid brick and 12-in. concrete block have coefficients of 0.32. In a companion series of tests on solar-heat penetration, the glass block eliminated 54.6 per cent of the available solar heat, while steel sash eliminated only 20.4 per cent.

Transmission of Light—Block with various types of rib and prism designs were tested under a 50 foot-candle light. For one design, 86.5 per cent of the light was transmitted; with the design used in the Owens-Illinois Building, 78.5 per cent was transmitted, whereas a ribbed wire-mesh plate glass transmitted 77.5 per cent and a plate with a pebble-dash surface transmitted 88.3 per cent. Expressed in another way, 1.3 sq.ft. of the block used in the building is equivalent to 1 sq.ft. of ordinary window pane. One face design transmitted only 11.7 per cent of the light, falling on it; such blocks are used where high light intensities are not desirable.

Building design and construction

The front part of the building is designed with beam and girder steel framing and is two stories high, while

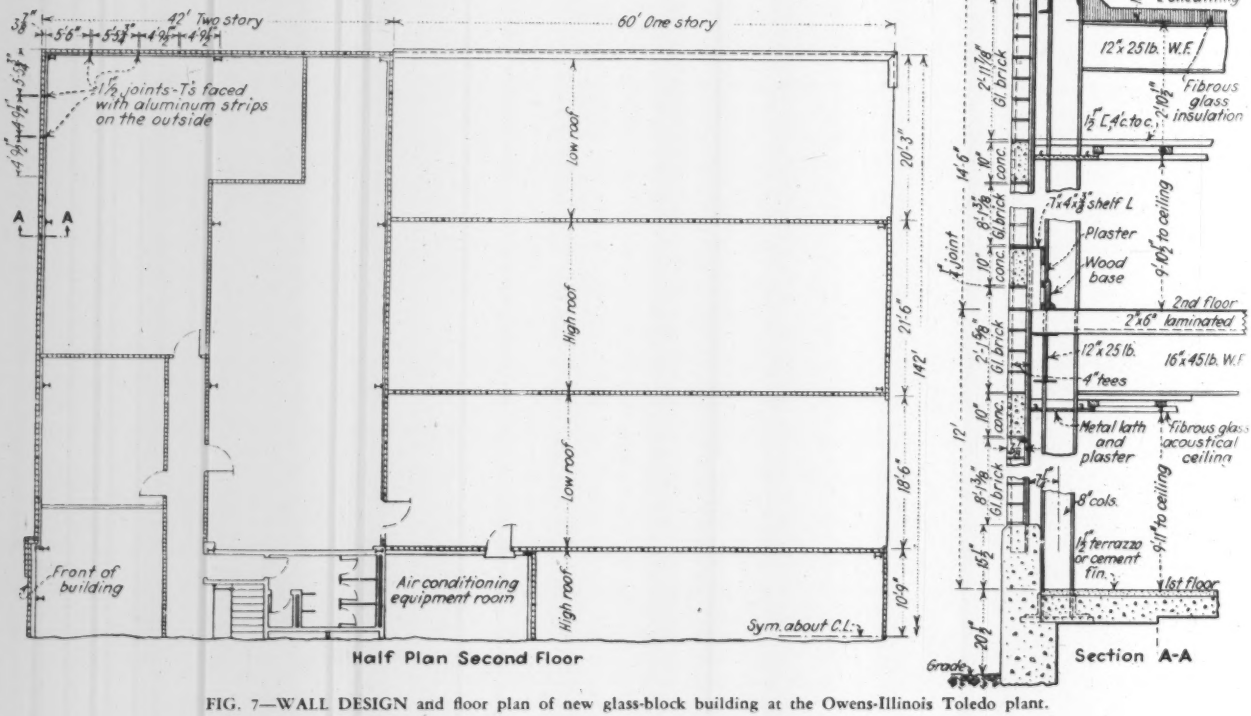


FIG. 7—WALL DESIGN and floor plan of new glass-block building at the Owens-Illinois Toledo plant.

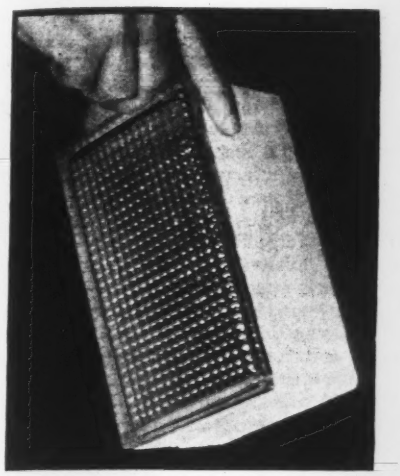


FIG. 8—SANDED ADHESIVE applied hot to the laying faces of the blocks provides the necessary mortar bond.

the rear is only one story with a monitor roof divided into four low and three high bays. The exterior walls are set 4 in. outside the columns, so that the glass block is continuous around the corners. Relief in the large expanse of glass wall is provided by dividing it into sections both horizontally and vertically. Thus two pairs of concrete bands are used at the second floor and at the roof, each pair enclosing several courses of green-colored block. Vertically the wall is divided into panels about 5 ft. wide by joints made with steel T's filled with mastic and faced with stainless-steel strips in the form of ¾-in. channels.

Inside, the 20,000 sq.ft. of floor space is divided into 39 rooms by glass-block partitions. All roofs are lined with fibrous glass insulation held in place by wire mesh painted white and left exposed, permitting the glass to function as acoustical as well as insulating material.

Laying of the block was done by masons who experienced little difficulty in equaling or exceeding the usual speed attained with ordinary brick. Because each glass block is about the size of two bricks, the workmen's hands, used to gripping brick, became slightly cramped at first, but this disadvantage wore off as the job progressed. Each block weighs about 4 lb. They arrive at the job in cardboard boxes, so that they are easily handled on the scaffold. A mortar made with 1 part of standard masonry cement and 2½ parts of sand was used to make the ¼-in. joints. Perforated metal wall ties were inserted every three courses and were bent up at the columns to furnish anchorage.

Mechanical equipment

The building is necessarily equipped for air-conditioning, and an interesting layout is used. All equipment is placed in an 18x20-ft. room on the second floor in the center of the building. From this room conditioned air is blown into seven different zones into which the building is divided, entering the rooms from the ducts near the ceiling and leaving them through grills in the partitions at floor level. Corridors are used for return ducts.

The air-conditioning system provides a non-draft flow of conditioned air at the rate of 26,000 cu.ft. per minute. En route to the conditioning system the air is cleaned of all dust and other foreign matter by passing through filters of fibrous glass. The equipment has a capacity to maintain a condition of 83 deg. dry bulb and 50 per cent relative humidity during periods of summer operation when the outside condition does not exceed 95 deg. dry bulb and 78 deg. wet bulb and when the equipment is handling 12,000 cu.ft. of fresh air and 14,000 cu.ft. of recirculated air per minute. Under these conditions the equipment uses 175 gal. per min. of water at a temperature of 53 deg. F. for cooling purposes.

Toilet and plumbing facilities are placed directly in front of the air-conditioning room on both the first and second floors, thus concentrating all of the mechanical equipment in the center of the building. Piping and ducts are run in the floor fills. Where wiring follows partition lines, it is placed in metal chases set under the partitions, which are laid up on a plank platform 6 in. above the floor. The architects were Walker & Weeks, Cleveland.

FIG. 9—DIFFUSED DAYLIGHT penetrates the walls of a second-floor drafting room. Note the air-conditioning duct along the partition and the fibrous glass roof insulation.

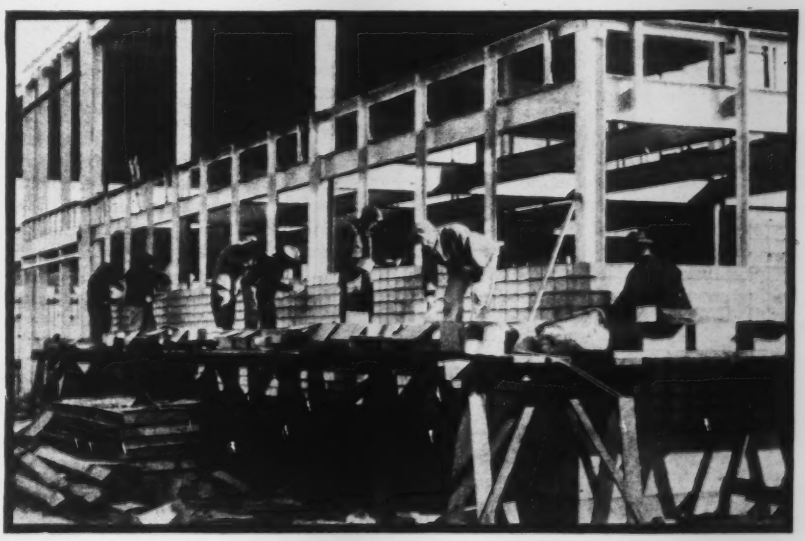


FIG. 10—MASONS laying up the wall of glass blocks which come to the job in cardboard cartons.

Letters to the Editor

Peening of Welds

Sir—Noting in your issue of Nov. 7, 1935, a letter by La Motte Grover under the heading "Bridge-Welding Procedure," in which Mr. Grover throws doubt on the advisability of peening welds in the field, the writer wishes to record apparently successful employment of the peening method in electric arc-welding reinforcement of railroad bridges.

The peening that the writer refers to has been done in butt joints where the parts connected by the welding have been rigidly connected and where unpeened welds have formerly cracked. The welds are placed in small layers, specified not to exceed $\frac{1}{8}$-in. thickness, and each layer is peened while still warm but never anywhere near the red heat mentioned by Mr. Grover. Shielded-arc electrodes are used.

The word "apparently" has been used to qualify the above statement on successful employment because these peened joints have not had the test of more than two years' service.

The economy of welding vs. riveting in many forms of reinforcement of existing structures is so overwhelming that any method that makes welding practical with good promise of serviceability will be followed.

Can Mr. Grover cite any cases of failure of peened welds or offer any practical substitute for them where unpeened welds will crack? If he would suggest annealing in the field, it will be stated here that this has been considered inadvisable in the writer' practice.

As to the best technique for field peening, this is a subject that is open to study and development.

New York, N. Y.
Jan. 16, 1936.

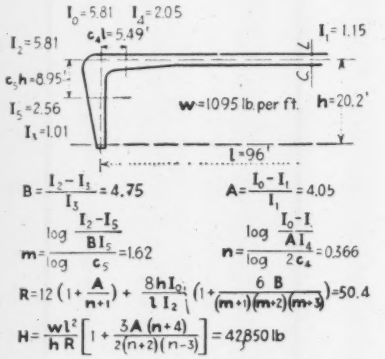
A. W. CARPENTER,
Engineer of Bridges,
N.Y.C. Railroad.

Rigid-Frame Design

Sir—In your issue of Jan. 2, p. 18, there is an article by C. D. Williams, "Rigid-Frame Design by Elementary Mechanics," which presents a good exposition of a well-known method of analysis. The surprising feature of this otherwise excellent paper, as voiced particularly in the closing paragraph, is the author's implied intolerance for any other approach to the goal.

That there is ample room for more than one method of analyzing structural frames is obvious. Witness the almost complete parallel between the graphical and analytical approaches to the comparatively simple subject of graphic statics. Assuming the choice of a method lies in the preference of the individual designer, the alternative method is still of value as a check.

In the matter of rigid-frame bridges the analytical solution, to which we suppose Mr. Williams had reference, appeared in two publications of the American Institute of Steel Construction—"Symmetrical Rigid Frames" and "Unsymmetrical Rigid Frames"—while a more general exposition appeared in a paper in the October, 1935, *Proceedings, Am. Soc. C. E.*.



COMPUTATIONS for determining the horizontal component of the dead-load reaction on a rigid-frame bridge by the "substitute I-curve" method.

As a comparison it is interesting to obtain the value of the statically unknown quantity H (the horizontal component of the reaction for dead load) by the method given in these papers. The computations are shown on the accompanying illustration. It will be noted that the value of H differs from that given by Mr. Williams by less than $\frac{1}{2}$ of 1 per cent.

It is obvious that the numerical labor in finding H by this method is a fraction of that entailed in dividing the structure into sections and obtaining H by semi-graphical summations, as Mr. Williams does in Table No. 1.

The parallel can be continued on through the influence lines.

We are presenting this discussion on Mr. Williams' paper to bring out the advantages of the dual approach to the design problems of the rigid frame. In this structure, as in many others, there is an analytical as well as the well-known semi-graphical solution.

WEISKOPF & PICKWORTH
New York, N. Y., Consulting Engineers,
Jan. 10, 1936.

A Study of Catalogs Proposed

Sir—The problem of improving engineering education has occupied considerable space in your magazine as well as other publications anxious to attack this important question. Generally, the tendency has been to suggest the liberalizing and broadening of engineering education.

I would like to suggest a subject of a practical nature—"A Study of Catalogs." I feel that if students were offered a course in catalogs, they would benefit in many ways. Today too many students graduate in engineering with but the vaguest knowledge of which firms manufacture the principal engineering materials, and with probably no knowledge of practical materials to specify for construction.

For example, in the cast-iron pipe industry, students graduate with very little knowledge of the types of cast-iron pipe, joints on cast-iron pipe, various standards (for example, in flange fittings there are A.W.W.A. standard and A.S.M.E. standard), and the use and adaptability of these types and joints. Also there is too little knowledge of accessories such as valves and sluice gates. I feel that one hour devoted to the catalogs of the various cast-iron pipe manufacturers, an hour for valves and sluice-gate catalogs, an hour for structural-steel catalogs, etc., would be a valuable addition to an engineer's education in school.

Should this idea appeal to any of your readers, I would be glad to cooperate in preparing a one-hour course in cast iron, or waterworks and sewage-disposal catalogs. No doubt, others would volunteer their services in their respective fields.

Chicago, Ill.,
Feb. 7, 1935.

L. C. ALK,
Estimating Engineer,
James B. Clow & Sons.

Frame Structures in Earthquakes

Sir—An article in your issue of Dec. 19, 1935, p. 856, brought inquiry to the writer as to the value of structural frames, either in structural steel or reinforced concrete, in buildings designed to resist a severe earthquake.

The framed structure, especially in the higher and more important buildings, has deservedly come to be looked upon as standard construction which can be so positively designed that it is possible for the engineer to predict, within comparatively narrow limitations, its action under any given load condition. Based on past performance, assurance can be given that if intelligently designed and constructed, such buildings will be found structurally intact after even the most severe shock. This type of construction has shown that it can stand abuse with minimum risk of collapse. In usual building construction rigid elements built integrally into the structure initially take load proportional to their relative rigidities and to the rigidities of the frame.

Assurance against damage from seismic disturbance is not so much dependent upon the kind of structural material used in an edifice as upon how the material is designed to be used and especially upon the character of materials and workmanship. This was pointed out in some detail by the writer

in articles in the July-August, 1933, issue of *California Highways and Public Works* and in the April 27, 1934, issue of the *Southwest Builder and Contractor*.

Practical limitations are such that the modern school building, as well as buildings in general, are of the rigid type. Consequently the recent *Engineering News-Record* article concerned itself mostly with this type. On the other hand, the dead-load weight of any given structure is quite important in that the force exerted as a result of any given seismic movement is directly proportional to that weight; consequently, the destructive force can be lessened in direct proportion as the weight is reduced. Safe schools have been constructed in Long Beach, as pointed out in the articles mentioned, wherein an attempt was made to break away from precedent and reduce weight through the design and construction of light flexible steel frames and floors.

For new construction the problem is relatively simple and involves little, if any, additional cost. It is the reconstruction work, especially of the masonry bearing-wall type of building, that taxes the structural engineer's ingenuity. Foundation soil for many of the existing school buildings, especially in the Compton area, was found to be badly waterlogged and greatly overloaded. For such conditions and where it was found advisable to lighten the weight of the building, brickwork was removed and replaced by wood-stud bearing walls with quite satisfactory results. In certain cases, steel studs have been used either for such substitute walls or for new work. The state has set up quite definite requirements which this type of construction must meet, and the results obtained have been entirely satisfactory.

CLARENCE H. KROMER,
Principal Structural Engineer,
Division of Architecture,
California Dept. of Public Works.
Sacramento, Calif.,
Jan. 9, 1936.

Improved Soil-Plasticity Needle

Sir—Some of the occurrences reported by Frank B. Campbell in the article on "Modified Soil Control Proposed for Rolled-Fill Dam Construction" (*ENR*, Jan. 30, 1936) were observed also during the construction of rolled-earth dams by the U. S. Forest Service (See "Soil Technology in Earth Dam Construction, as Employed in Back Creek Earth Dam," *Public Works*, May and June, 1935, Vol. 66, Nos. 5 and 6). Densities obtained by rolling the embankment were never quite as great as those obtained by means of the testing apparatus in the laboratory, no matter how many trips of the roller were made. That the soil is rigidly confined during compaction in the testing cylinder, but confined in the fill by a plastic mass, may be an important factor, as suggested by Mr. Campbell, and seems

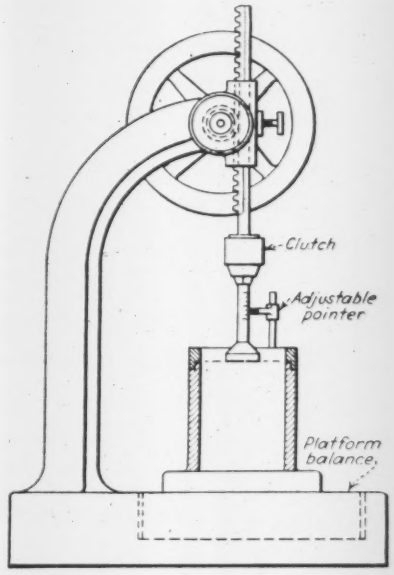


FIG. 1—SOIL-PLASTICITY NEEDLE with precise vertical penetration and controlled rate of penetration.

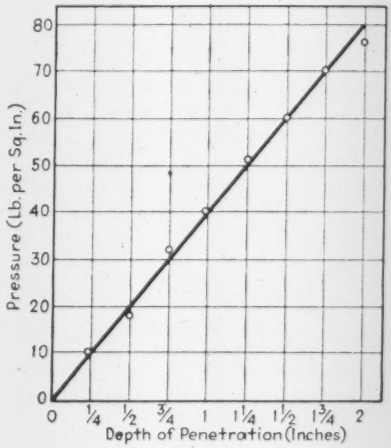


FIG. 2—TEST CURVE in sand, showing the close relationship between pressure and penetration.

to be a reasonable explanation for this difference.

Difference in the degree of disturbance of the natural structure of the laboratory sample and fill soil might be an additional factor. The laboratory samples are dried and pulverized in preparation for testing. This completely destroys the natural structure of the soil, whereas in the fill the natural structure is in many cases but partly destroyed. This is especially true if the soil is very moist when spread on the fill. This explanation is supported by my own observations, which disclosed that while densities obtained by rolling were often much less than those obtained by compacting the specially prepared samples in the laboratory, they usually compared very favorably and in some cases exceeded the densities obtained by compacting the soil in the testing cylinder in the same condition as it was delivered on the fill.

To determine the extent of compaction during construction of the Back Creek Dam, approximately 15 lb. of the compacted soil were removed from the fill by a post-hole auger, weighed, and the wet density computed from the volume as determined by the dry-sand method. The same soil was then compacted in the Proctor cylinder. A comparison of the wet densities of the compacted fill and tamped sample of the damp-fill material indicated whether more rolling was required. Moisture contents were determined by oven-drying small samples.

The improved needle footing for the plasticity needle, as described by Mr. Campbell, is but one of many possibilities for improvement. In the use of the needle, as originally designed, the possibility of personal error was very high for the following reasons: (1) it was almost impossible to obtain perfectly vertical movement during penetration; (2) the position in which the operator was forced to stand made accurate measurement of the depth of penetration very difficult, especially when the soil adjacent to the penetrated area bulged; (3) a constant rate of penetration was very difficult to attain, partly because of (2), but more because the movements of the handle, due to deflection of the force indicating spring, could be several times the movement of the needle footing. In addition, the resistance to penetration, even at the optimum moisture content, is often greater than the maximum of 2,000 lb. per sq.in., which can be measured with the original plasticity needle.

An improved plasticity needle has been designed for laboratory use at George Washington University, in connection with a research project on soil stabilization under the Department of Civil Engineering, supervised by Prof. F. A. Hitchcock. The new instrument has the design features shown in Fig. 1. It is essentially a form of press that insures vertical movement of the footing, accurate measurement of the depth, and hence control of the rate of penetration. The pressures are determined by means of a platform balance of 300-lb. capacity and not subject to apreciable vertical movement. Depth of penetration is measured by means of a pointer referring to graduations on the needle stem. With the same needle footings used in the original apparatus, pressures up to 6,000 lb. per sq.in. can be measured.

The procedure for this test has been as follows: the cylinder with the compacted soil is placed on the balance, and the needle footing is adjusted to just touch the soil. This may be accomplished very accurately by noting the elevation where the slightest pressure on the lever arm will cause an increase in the balance reading. The pointer is set at zero. The weight of the cylinder and compacted soil is recorded as the initial reading. The needle is then slowly forced into the soil at the rate of ¼ in. per minute, and

balance readings are taken at each succeeding ¼-in. depth of penetration. The force of penetration may then be computed from the area of the needle footing and the balance readings (less the initial reading).

The curve (Fig. 2) shows a very interesting relationship between pressure and depth of penetration for a sandy soil and illustrates graphically the necessity of accurately measuring the depth of penetration. The tendency of the soil to "build up" resistance as the depth of penetration is increased may be clearly seen. However, contrary to the observation of Mr. Campbell, the needle did not break through at any depth. A probable explanation for this is that the soil used in this particular test had a higher sand content and hence a higher coefficient of internal friction than soils commonly used for earth-dam construction. This type of soil would be less likely than the plastic materials to have laminations in the compacted samples which are productive of the "breaking through."

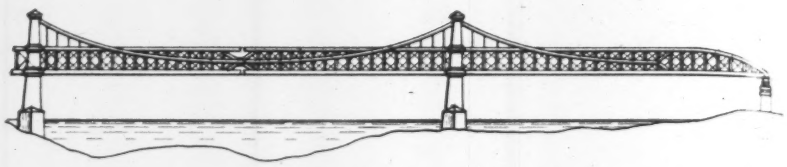
C. A. HOGENTOGLER, JR.
Research Associate,
George Washington University.
Washington, D. C.,
Feb. 27, 1936.

Widening a Concrete Bridge

Sir—Fifteen years ago, before much thought was given to the elimination of curves and narrow bridges, a 34-ft.-span concrete girder bridge with a 16-ft. clear roadway was constructed in Preble County, Ohio, and placed on the old abutments of a wood-truss bridge which was located on a sharp S curve. It recently became necessary to remove this curve and to provide a wider bridge. Since the old concrete girder bridge was in excellent condition, it was decided to widen and realign the roadway by constructing a triangular reinforced-concrete girder on both sides of the present bridge, increasing the width 14 ft. In the new 30-ft. width, 3-ft. sidewalks and a 24-ft. roadway are accommodated.

To construct the new addition, it was necessary to remove only a few feet of the old balustrade and thus permit traffic to be maintained at all times, eliminating the expense of a temporary bridge and roadway. After the work was completed, the old balustrade was removed. The work was done by force account.

OTHA HECATHORN
County Engineer,
Preble Co.
Eaton, Ohio,
Dec. 5, 1935.



BENDER'S suspension bridge, which was patented in 1867.

Self-Anchored Suspension Bridge

Sir—Mr. Mullins is to be congratulated on his interesting article entitled "The Self-Anchored Suspension Bridge" (*ENR*, Jan. 9, 1936, p. 45), but I would like to call attention to the fact that it is somewhat doubtful if Josef Langer was the real originator of this type of bridge, for on Dec. 10, 1867, Charles Bender of New York was granted a patent, No. 71,955, on a suspension bridge which from both the description and the illustration appears to be a true self-anchored bridge. The following is an exact copy of his patent description found on p. 1433 "Patent Office Report," 1867, Vol. 2.

71,955.—Charles Bender, New York, N. Y.—Suspension Bridge.—December 10, 1867.—The trusses are connected by yielding joints at certain places. The chains are attached to the bridge and not to abutments. The ends are so secured to the piers as to allow of expansion, while no movement is admitted at the central piers.

Claim.—First, the construction and arrangement of one or more yielding joints, connecting the beams or trusses of stiffened suspension bridges, substantially as herein described.

Second, the attachment of the ends of the cables or chains, at or near the first or shore piers, to the longitudinal beams or trusses of stiffened suspension bridges, substantially as set forth.

Third, the means and method by which the ends of the beams or trusses of stiffened suspension bridges are secured to the shore piers by vertical anchorages, and the arrangement of suitable joints in said anchors, substantially for the purpose described.

Fourth, the means and method employed to reduce the side motion, by attaching the longitudinal beams or trusses of stiffened suspension bridges to the central piers sidewise, said attachment being on one pier perfectly immovable in any horizontal direction, while at the other piers allowance is made for the variations of the length of the beams, substantially as set forth and described.

This description clearly shows that Mr. Bender's patent warrants a place in the history of self-anchored suspension bridges, and that he is perhaps the true creator of this type of bridge. Charles Bender was the author of a paper entitled "Historical Sketch of the Successive Improvements in Suspension Bridges to the Present Time," which will be found in *Transactions*, Am.Soc. C.E., Vol. 1, 1872. In this he attempted to settle the claims of various engineers and to prove the priority of American inventions. I am happy to do for Mr. Bender what he did for his predecessors.

A. A. JAKKULA,
Asst. Prof. in Civil Engineering,
University of Michigan.
Ann Arbor, Mich.,
Jan. 21, 1936.

WIDENING a concrete bridge by addition of new girders and triangular-shaped pieces of deck on either side. After completion of the work the old balustrades were removed.

Repeated Stresses on Bridge Stringers

Sir—A better quantitative picture of the repeated stresses to which the aluminum stringers of the Smithfield Street Bridge in Pittsburg were subjected than was given in my article on the subject in the Feb. 27 issue, p. 318, may be obtained from the following:

At the time of the first inspection the bridge had been in service 240 days, and at the time of the second inspection 662 days. Each streetcar using the bridge has four wheels on a rail, and the flange stresses were consequently repeated four times during the passage of one car. There are 1,192 scheduled trips one way across the bridge, so that the flanges were stressed 4,768 times per day. Thus they failed some time in the range of 1,144,000 to 3,156,000 repetitions of stress.

HENRY D. JOHNSON, JR.,
Chief Engineer,
Dept. of Public Works.
Pittsburgh, Pa.,
March 1, 1936.

Book Reviews and Notes

A Monthly Commentary on Current Additions to the Civil Engineers Library

Thomas Telford

THE STORY OF TELFORD, The Rise of Civil Engineering—By Sir Alexander Gibb. Cloth; 6x8¾ in.; pp. 357; illustrated. Published by Alexander Maclehose & Co., London. 16 shillings.

NO CIVIL ENGINEER can read Sir Alexander Gibb's life of Thomas Telford without gaining new inspiration and a fuller recognition of the debt that the profession owes to the pioneers in civil engineering. Telford, who ultimately became the first president of the Institution of Civil Engineers, stood foremost among those pioneers. He is best known for the Menai Straits Suspension Bridge, a structure that still stands as a monument to his daring and genius, but many other great works such as the Caledonian Canal in Scotland were conceived by him and carried out under his direction.

Telford was born in Scotland, the son of a shepherd, and as a youth was apprenticed to a mason. In those days stone masonry was the material from which most of the structure of both civil and military engineering nature were built. Telford, in his early training, learned the fundamentals of how to use stone; and as his later history showed, he also learned something of its limitations, for it was he who later pushed out into the then unexplored field of the use of iron in bridge construction, first in arches and then in suspended spans.

While still a young man Telford went to London to expand his knowledge of masonry construction. One of the first things that impressed him was the ignorance of all but the simple mechanics of stone construction on the part of the great majority of the men with whom he worked. They could cut and lay stone to designs handed them; they gave no thought to the designs themselves. Telford wanted to know why a particular design was used and whether it could not be improved upon and set himself to learn. From that time on until he had risen to be a recognized authority in the rapidly developing field of civil engineering the story of his life is a record of long hours working at his job during the day and studying at night, learning all he could from the very limited sources of architectural and engineering knowledge that were then available. Knowledge thus obtained, backed by an ever-increasing practical experience, gave Telford a confidence that is evident in the boldness of his designs. The history of his life, as the subtitle of this book states, is a record of the "Rise of Civil Engineering." Many of the principal works of the civil engineer—canals, aqueducts, bridges, highways and waterworks—owe a debt to the genius of Thomas Telford.

Miscellaneous Notes on Booklets and Reprints

FINANCIAL MANAGEMENT FOR HIGHWAYS is the title of Bulletin No. 8, Engineering Experiment Station, North Carolina State College of Agriculture and Engineering, Raleigh. Price, $1.

THEORY OF FLOW OF WATER is the subject of a paper by R. K. Khanna, assistant engineer, Punjab Irrigation, Rajar, District Gujrat, Punjab, India. The paper is privately printed and distributed.

CLEVELAND'S MUNICIPAL LIGHT PLANT, its history and present status after twenty years of operation, is described in a multigraphed pamphlet prepared by the Department of Public Utilities, Cleveland, Ohio.

THE ENGINEER'S DUTY AS A CITIZEN, an outline for a discussion talk at the Newark College of Engineering, by Roy V. Wright, has been revised and republished by the Newark College of Engineering Press, 245 Market Street, Newark, N. J.

IRRIGATION IN AUSTRALIA is the subject of a paper by A. D. Lewis, director of irrigation for the Union of South Africa, prepared following Mr. Lewis' visit to Australia. The paper is published by the Irrigation Department, Union of South Africa, Pretoria, South Africa.

THE PLASTIC FLOW OF CONCRETE is the subject of Bulletin 91 of the Engineering Experiment Station, Ohio State University, Columbus. It is written by Prof. J. R. Shank, who discusses the results of recent research and presents methods of applying the data to the design of structural members. Price 50c.

FOUR BOOKLETS on building research published by the Department of Scientific and Industrial Research (Great Britain) cover the following subjects: "The Prevention of Corrosion of Lead in Buildings," "The Effect of Building Materials on Paint Films," "The Quaternary System $CaO = Al_2O_3 = SiO_2 = Fe_2O_3$ in Relation to Cement Technology," and "Correlation between Laboratory Tests and Observed Temperatures in Large Dams." Copies can be obtained in this country from the British Library of Information, 270 Madison Ave., New York City. The prices are, respectively, 10c., 10c., 35c., and 30c.

STUCCO AND FORMS for architectural concrete are the subjects of two bulletins of the Portland Cement Association, 33 West Grand Ave., Chicago, Ill. The latter book contains much information on the loads on formwork and on the strengths required to prevent deformation in forms. Information also is included on the use of steel, plywood, presdwood and plaster for formwork.

MANY DETAILS OF BRIDGES, built with steel bearing piles are given in a booket prepared by the Carnegie Steel Co., Pittsburgh, Pa. The booklet contains numerous line drawings of bridges, trestles, piers and abutments built with steel piles or supported on steel piles. Methods of capping and splicing steel piles are given, as well as data on the bearing capacity.

THE GOLDEN GATE BRIDGE is described in simple language in a pamphlet published by E. Cromwell Mensch, 447 Sansome St., San Francisco, Calif. (Price, 50c, postpaid). The author spent a great deal of time with the engineers in learning how the operations of constructing the bridge are being carried out. The illustrations of the methods of construction are particularly well done.

New Books and Revised Editions

[Those desiring copies of the books listed below or mentioned elsewhere in this section should order them from the publishers or from their local booksellers.]

BIBLIOGRAPHY OF PLANNING, 1928-1935: (A Supplement to "Manual of Planning Information, 1928," By Theodora Kimball Hubbard and Katherine McNamara); Harvard City Planning Studies X—By Katherine McNamara. Cloth, 7x10 in.; pp. 232; Published by Harvard University Press, Cambridge, Mass. Price $3.50.

CAST IRON PIPE: ITS LIFE AND SERVICE—The Stanton Ironworks Co., Ltd. Cloth; 5x8 in.; pp. 118; photographs and tables. Price not given.

HIGHWAY SURVEYING AND PLANNING: Formerly published under the title "Highway Curves and Earthwork"—By Thomas F. Hickerson. Second edition. Cloth; 4x7 in.; pp. 422; numerous diagrams and tables. Published by McGraw-Hill Book Co., Inc., New York and London. Price $3.50.

PLAIN CONCRETE—By Edward E. Bauer. Second Edition. Cloth; 6x9 in.; pp. 364; photographs, drawings and tables. Published by McGraw-Hill Book Co., Inc., New York and London. Price $4.

TRAVAUX MARITIMES—Tome troisième. By Louis Prudon. Paper; 5x7½ in.; pp. 425; numerous diagrams. Published by Dunod, Paris, by Bibliothèque de l'Ingénieur de Travaux Publics. Price, bound, 81 francs; brochure, 72 fr.

Reports on Record Floods

Continued from p. 446

city was badly damaged by swift waters, buildings being wrecked, homes torn from their foundations, and the streets strewn with debris of all kinds. At the height of the flood on Wednesday night fire destroyed several business establishments. The water supply is reported to have failed. Industrial plants will not be able to operate for several weeks, and taking care of the thousands they normally employ threatens to become a serious relief problem.

City quarantined

Sunbury, just below the junction of the North and West Branches of the Susquehanna, was likewise badly damaged. The entire town was placed under quarantine because of scarlet fever and measle epidemics, and every citizen not affected was ordered out.

No dams lost

As the flood waters raged, the populace was terrified again and again by reports of breaking of dams throughout the area. Actually, however, not one dam of importance in the whole state went out. Authorities attribute the stability of the dams on the mountain streams to the operation of the state water and power resources law, passed in 1913, giving the state jurisdiction over construction and repair of all dams.

Hydrology of New England Floods

By H. K. Barrows

Professor of Hydraulic Engineering, Massachusetts Institute of Technology; Consulting Engineer, Boston, Mass.

FLOOD CONDITIONS in New England which occurred during the highwater period of March 11-14 were noted in last week's issue. At that time the Connecticut River reached stages nearly equal to those of 1927, and the Merrimack River reached those of 1896. In Maine, due largely to ice jams on the larger rivers, much damage resulted.

The period March 18 to 22 has witnessed far worse conditions prevailing over much of New England. The greatest and most widespread floods ever known occurred in this district, with flooding of large areas in the cities along the Connecticut and Merrimack and in Maine, loss of bridges and interruption of transportation and business to an unprecedented degree.

It is impossible as yet to give more than a preliminary statement regarding conditions of precipitation and temperature leading up to these floods, and only a few runoff figures are available.

Heavy rains and deep snow

Conditions of daily temperature and precipitation are shown in the appended tables for the period March 10-20 inclusive, and depth of snow for each week for such stations as obtainable.

As will be noted, precipitation to a considerable extent occurred in the White mountain region, as well as central Maine, on March 12 and 13, preceded by unusually high temperatures from the 10th to 12th, with a total effect sufficient to produce the flood or high-water conditions of March 11 to 14. The station at Pinkham Notch in the White Mountains showed nearly 8 in. of rain on March 12-13, with maximum daily temperatures of 44 deg.

The next week this same station March 17-19 showed nearly 10 in. of rainfall and again high maximum daily temperatures of about 47 deg. Between March 10 to 20 snow accumulations in the general region were reduced in depth about one-half.

When complete reports for all stations are available, a more accurate and detailed study will be possible. It is obvious, however, that the basic cause of the unusual flood was heavy rainfall and temperature sufficiently high to cause widespread melting of snow on the ground.

Streamflow far above records

The resulting runoff, in both the Connecticut and Merrimack Rivers, was unprecedented, as will be seen from the appended table, where comparison is made with previous maximum floods on these rivers. The figures given for 1936 are as yet available at but few points and may be changed somewhat from those given when more accurate and complete estimates are possible.

On the Connecticut River, at the main river stations listed, a flow probably at least 20 per cent greater than that of November 1927 occurred. On the Merrimack, the flow was 50 per cent or more greater than during the flood of March 3, 1896, which was also a melting snow flood. No data of runoff are available as yet for the upper stretches of these rivers or their tributaries.

TABLE I—TEMPERATURES DURING FLOOD PERIOD IN NEW ENGLAND

Station	Max. and Min. Temperatures March, 1936																					
	10		11		12		13		14		15		16		17		18		19		20	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Mt. Washington Summit, N. H.	34	18	34	30	37	28	15	14	28	4	33	6	35	22	37	30	37	32	35	31	..	21
Pinkham Notch, N. H.	44	24	44	34	44	39	33	30	33	22	42	18	40	32	47	32	47	39	46	39	..	33
Concord, N. H.	50	34	50	36	50	46	42	36	..	30	52	..	50	32	66	38	54	50	50	46	..	38
Northfield, Vt.	46	30	50	34	48	38	36	34	..	24	48	..	40	36	54	34	..	48	52	..	..	38
Burlington, Vt.	44	34	54	40	50	46	36	32	..	24	50	..	42	40	58	32	62	52	58	50	..	36
Greenville, Me.	48	26	50	28	46	40	38	34	..	26	38	..	36	32	48	34	52	44	46	44	..	34
Portland, Me.	42	34	46	36	50	42	42	36	..	32	44	..	42	34	56	38	60	46	46	44	..	40

TABLE II—PRECIPITATION IN NEW ENGLAND, MARCH 10-20

Station	Precipitation (8 a.m. Readings) March, 1936										
	10	11	12	13	14	15	16	17	18	19	20
Mt. Washington Summit, N. H.	.70	....	1.66	2.27	.21	.....	.14	1.15	1.32	2.53	.94
Pinkham Notch, N. H.	.50	....	4.14	3.62	.10	.....	.57	.68	3.25	6.29	.40
Concord, N. H.	.22	....	2.58	.68	.01	.01	.....	.02	.10	2.46	.10
Northfield, Vt.	.12	....	.58	.66	.02	.....	.10	1.36	.18	.....	.10
Burlington, Vt.	....	....	.44	1.02	.04	.....	.12	.78	.02	.28	.08
Greenville, Me.	.02	....	1.14	3.62	.20	.....	.10	.88	.32	1.18	1.12
Portland, Me.	.52	....	.92	.76	.02	.....	.....	.04	.01	.62	.32

TABLE III—DEPTH OF SNOW AT KEY POINTS

Station and Elevation	Depth of Snow, Inches		
	Mar. 2	Mar. 9	Mar. 16
Mt. Washington Summit, N. H. (6270)	15	18	12
Pinkham Notch, N. H. (2000±)	45	47	32
Gardiner, Me. (200±)	17	20	..
Greenville, Me. (1070)	36	38	25
Portland, Me. (100±)	10	15	3
Berlin, N. H. (1110)	31	25	..
Concord, N. H. (400±)	11	7	0
Pittsburgh, N. H. (1660)	38	34	24
Bloomfield, Vt. (930)	38	30	..
Burlington, Vt. (300±)	6	2	0
Northfield, Vt. (876)	23	17	5
Rutland, Vt. (610)	8	..	..

Based upon the estimated peak discharge at Vernon on the Connecticut River of 185,000 sec.-ft., and a flood hydrograph similar to that of 1927, with a base time of eight days, the total flood runoff during the flood of March 18-22 would be about 4½ in. over the drainage area of 6,220 square miles. Probably upwards of 3.5 in. had already passed off the previous week, so that some 8 in. of runoff occurred in the period March 12 to 22.

A similar computation for the Merrimack shows about the same results in depth of runoff.

The flood of March 18-22 included practically all the major river systems of New England, whereas that of 1927

TABLE IV—IN NEW ENGLAND RUNOFF FLOOD OF MARCH 18-22, 1936.
(Preliminary)

River	Point	Drainage Area Sq.Mi.	Previous Max. Flood Discharge Year	Discharge c.f.s.	Discharge c.f.s. per sq.mi.	Flood of Mar. 18-22 1936 Approximate Discharge c.f.s.	Approximate Discharge c.f.s. per sq.mi.
Connecticut	Bellows Falls, Vt.	5300	1927	.....	.....	150,000	28
	Vernon, Vt.	6220	1927	155,000	25	185,000	30
	Turners Falls, Mass.	7170	1927	171,000	24	205,000	28
	Holyoke, Mass.	8120	1927	169,000	21	200,000	25
	Thompsonville, Conn.	9740	1927	.....	..	250,000	26
Merrimack	Lowell, Mass.	(a) 3979	1896	100,000	25	160,000	40
	Lawrence, Mass.	(b) 4452	1896	100,000	22	175,000	39

(a) Present net area—in 1896 area was 4,097 square miles.
(b) Present net area—in 1896 area was 4,664 square miles.
Note: The data of flow for 1936 are probably conservative, as unverified press reports show larger flows at Turners Falls and below on Connecticut River.

MIDDLETOWN, CONN., BRIDGES at the height of the Connecticut River flood. Plans, under way for a year to replace the highway crossing in the background, came to a head on March 23, with the awarding of contracts for a $3,000,000 high-level bridge.

had its worst effects in Vermont, western Massachusetts, and to some extent in New Hampshire. At that time, however, the Merrimack as a whole did not have an outstanding flood.

Reservoir control valuable

The effect of reservoir control upon floods, especially those due to springtime conditions of melting snow, was again strikingly demonstrated in the present flood by conditions upon the Deerfield River, which is one of the larger tributaries of the Connecticut in Vermont and Massachusetts. The Harriman and Somerset Reservoirs on this river control 182 square miles of its upper drainage. During the past week Harriman Reservoir filled to about 85 per cent of its capacity, but no floodwaters passed it. This had an important effect in reducing flow to the lower Connecticut River, as the Deerfield drains areas of very high runoff.

This points the way to the manner by which floods on such rivers as the Connecticut and Merrimack may be materially lessened in effect. A study of these two river systems is already under way by the state planning boards, under the coordination of the New England Regional Planning Commission working through its water resources committee. When the complete story of the present flood is available, with accurate data of run-off at different points, it will be possible to determine the feasibility of preventing or lessening the excessive damages that have just occurred.

Much work already has been done by Vermont and New Hampshire, as well as by the U. S. Engineers Corps, in working out power reservoir sites on the Connecticut and Merrimack Rivers, but there remains to be accomplished a complete and coordinated scheme, with the different states working together under compacts, to obtain effective results for the entire river basins. This should also include the cooperation of federal and municipal authorities as well as power companies on these rivers, all of whom are vitally interested.

Plans should be worked out while the lessons of the present flood are still in mind. The probability of such flood conditions recurring from time to time is obvious from the fact that twice within the last ten years major flood disasters have occurred here in New England. The 1927 flood in New England entailed a loss of $40,000,000. The damage in the present flood may be more than double this figure, according to press reports. The total amount is only conjecture as yet.

New England Flood Exceeds That of 1927

By V. T. Boughton
Managing Editor, Engineering News-Record

IN NEW ENGLAND, as in much of the area affected by the floods, the major flood came a week after a period of high spring freshets caused by mild temperature and rainfall on the snow cover. The second crest came in the week of March 15-21 except in the lower part of the Connecticut River Valley.

With one notable exception, the flood-flows at the time of the second peak exceeded those of the 1927 flood in the western part of New England and the 1896 record for the eastern part. The exception is the Winooski River in Vermont, the scene of the major damage during the 1927 flood, where two flood-control reservoirs have been built since the 1927 disaster. Whether these reservoirs are entirely responsible for the reduction in the flood flows is not now known but their dams at Wrightsville and East Barre did hold back all water from the tributaries above them. In the Connecticut Valley, draining the greater part of the western side of New England, the flood crest of the high water of the week of March 8-14 passed down the river, causing high water somewhat below the level of the 1927 flood, but the heavy rain of the latter part of that week immediately began to show its effects, and it was evident by March 15 that a second and worse flood was in prospect.

Early on Wednesday morning, March 18, the old Greenwood Dam at New Hartford on the Farmington River failed, sending a flood wave sweeping down through the villages below and taking out some of the old bridges. The report of this failure came at about the time the flood crest reached the Vernon Dam, just above the Massachusetts line, and helped to reinforce the rumor that that dam also had failed. Actually the dam itself never was in serious danger; it is a modern concrete structure built on solid rock. There was some erosion at the east abutment. Rumors that the famous old Holyoke Dam was endangered were equally unfounded.

Greenwood Dam

Greenwood Dam was an old structure built about 90 years ago. It consisted of a timber dam about 150 ft. long and about 20 ft. high across the river, flanked at the west end by a heavy masonry wall forming the upstream end of an old mill built at the time the dam was erected, and flanked at the east end by a high masonry abutment backed by a long earth fill extending back to the east side of the valley. The present mill building and intake structure are at that end. Spanning the spillway was a light steel footbridge.

The timber spillway section of the dam was not of the self-loading type frequently built in the old days but had a nearly vertical upstream face supported by a heavy timber framework extending downstream on a flat slope, probably to buried sills. This supporting framework was filled with loose rock and protected from scour by a timber apron.

Examination of the small section remaining at the west side of the dam indicates that the buried timber was

very badly decayed, so badly that it is difficult to see how the structure stood as long as it did.

Fortunately for the people of Hartford and other points below, the Greenwood Dam failed before the flood crest had reached the lower river, and so the water from Greenwood Lake was not superimposed upon the main river flood.

At the peak of the flood, water was 16.8 ft. deep over the crest of the Holyoke Dam as compared with 14.8 ft. in the 1927 flood.

The crest of the flood reached Springfield, the largest city in the Connecticut River Valley, at 7 a.m. Saturday and registered 28.6 ft. on the gage at the Memorial Bridge as compared with 22.4 ft. in the 1927 flood. By that time three highway bridges above Springfield had gone out, and water was over the approaches to both the bridges at Springfield, although the bridges themselves were well above the flood crest.

The plant of the United Electric Light Co. on the waterfront was flooded despite every effort to keep the rising water from reaching the generators. Much of the low-lying part of the business section of the city also was under water, including the telephone exchange, so that both telephone and power services were cut off for a time. Within a short time, however, power for the part of the city not under water was obtained from an outside source. The telephone company set up an emergency plant in the street and soon reestablished a limited service.

Hartford was more seriously affected by the flood than any other city on the river because much of the city lies at a low level. The flood crest reached there Saturday morning and registered 37.56 ft. on the gage as compared with the previous maximum of 31.4. At the height of the flood 20 per cent of the city was under water to depths up to 25 ft. Along Park River, which flows past the Capitol grounds and into the Connecticut at Hartford, the floodwaters set back into the heart of the business district.

The power plant at Hartford was flooded out Thursday evening and the power supply was not restored until Sunday when power was obtained in part from the plant of the Connecticut Power Co. on the Farmington River at Tariffville and in part from an emergency plant brought in a baggage car of the New Haven R.R.

The water supply of neither Springfield nor Hartford was affected, both cities drawing their supply from upland sources.

Hudson Crest Reduced by Reservoir

By Edward H. Sargent
Chief Engineer, Hudson River Regulating District, Albany, N. Y.

FROM March 18 to 20, 1936, the Hudson River experienced one of the greatest floods in its known history and at the same time its two principal tributaries, the Mohawk and Sacandaga Rivers, experienced *the greatest* floods in their history. The Mohawk River with a watershed of 3460 square miles at Cohoes reached a peak discharge on March 19 of 134,000 sec.-ft. at 5 a.m. The previous maximum discharge March, 1913, was approximately 100,000 c.f.s.

At Albany, where the drainage area is 8,100 sq.mi. the maximum elevation reached during the present flood was 17.70 ft. (sea-level datum) at 2 p.m. March 19, against a maximum of 21 ft. on (March 28, 1913). By March the Hudson had receded to 9.90 ft.

The flow of the Hudson River Mechanicville, with a watershed of 45 sq.mi., reached a peak of 84,000 c. on March 19, from which it is estimat that the maximum flow at Albany March 19 was in the vicinity of 220,0 c.f.s., whereas the 1913 peak was abo 240,000 c.f.s. It is estimated that Sacandaga Reservoir reduced the flo peak at Albany by approximately 50,0 c.f.s., which means that the flood hei was probably lowered about 4 feet.

The floods were caused by hea precipitation with a high temperatu occurring at a time of heavy sno cover. The rainfall stations at Ho and Conklingville on the Sacandag watershed showed a rainfall of 3.86 i and 4.72 in. respectively, from Mar 11 to 18th. The snow survey of th Sacandaga watershed made at 18 point on March 1 showed an average dep of about 30 in. and an average wat equivalent of 6.38 in., though som measurements gave a water content o over 10 in.

The Sacandaga Reservoir, which drains 1040 sq.mi., had a peak inflo on March 18 at noon of 65,000 c.f.s. In this connection it is pertinent to not that flood studies made in connectio with the design of the Conklingville Dam (which creates the Sacandaga Reservoir), for which streamflow records for 17 years at the dam site were available including the 1913 flood—which at other points on the watershed where long-term records were available ap peared to be the greatest flood in the history of the river—indicated from Fuller's formula that a 1000-yr. flood would be 56,600 c.f.s. This predicted 1000-yr. flood was exceeded last week by nearly 10,000 c.f.s.

The maximum inflow to the Sacandaga Reservoir of 65,000 c.f.s., on the 19th had decreased on March 21 to 20,000 c.f.s. It is expected that a high rate of inflow will continue for some time, because of the large amount of water remaining in the lakes, ponds and pools and the continued melting of the remaining snow, which it is estimated is at least one-third of that existing when the snow surveys were made.

Although a flood of such a great extent was not anticipated, yet it had been felt that a large flood was certain because of the deep snow cover and the absence of January or February thaws. Accordingly the Sacandaga Reservoir was nearly completely depleted in January and February and during the first ten days of March, reaching the low level of 735.73 (spillway crest 771.0 ft. above sea level). The reservoir rose to elevation 754.30 on March 21, the maximum 24-hr. rise being 5.33 ft. on March 19. A total of 14.8 billion cubic feet or 340,000 acre-feet had been impounded from March 13 to March 21.

TWO BRIDGES over the Merrimack above Manchester, N. H., which lost some of their spans.

Utility Damage in New England

By H. S. Knowlton
New England Correspondent, Engineering News-Record

POWER COMPANIES, while suffering heavily from flooding of plants, substations and distribution systems, which led to serious interruptions of service in the "valley" communities, displayed remarkable resiliency. The Connecticut Light & Power Co.'s Scotland Dam hydro plant (1200 kw.) on the Shetucket River near Norwhich was wrecked by ice and water which overtopped the crest and ruined the building and probably the major electrical equipment.

The New England Power Association system bore the brunt of flood conditions over a wide area. The dams of the hydroplants on the Deerfield and Connecticut Rivers all held. At Vernon, Vt., the peak flow was 19.3 ft. above the crest of the dam on Thursday the 19th, with a flow of 185,000 sec. ft. The plant was flooded and shut down, but by Saturday the crest flow had fallen to 15.5 ft. The Bellows Falls station, also on the Connecticut, was in continuous operating condition although one switchyard was flooded. The 156,000-kva. Comerford plant at 15-Mile Falls operated continuously. The Deerfield plants were all in operation at the week-end. Service at Webster, Mass., was impaired by the flooding of the steam plant boiler room, and overflow also forced temporary shutdown of the Worcester Electric Light Co.'s steam plant, power being relayed into the city through interconnections.

The Cabot station of the Western Massachusetts Companies' system near Greenfield was flooded 8 ft. over the generators and was shut down. The State St. steam plant at Springfield was flooded to the generator shafts and also thrown out of service. The smaller hydro plants of the company and the Cobble Mountain plant of the Springfield water-supply system helped maintain service in the Springfield areas. Interstate connections were re-established with Hartford where the steam plants of the local utility were flooded. Hartford was without power for about 48 hours while these connections were being made.

In the Merrimack valley high-voltage power supply from outside was well maintained, but local company plants at Lawrence, Lowell and Haverhill were flooded out.

Damage To Roads and Railroad Lines

Early surveys of road damage before the overflow had everywhere subsided, indicate that damages are mainly shoulder scour, washed slopes and destroyed bridges and culverts. The repairs required are of small cost individually but the total is a considerable sum.

In New York the sum required for repairs due to flood is temporarily estimated as $1,720,000, of which $1,118,000 is for county and town roads. Pennsylvania reports 30 large bridges lost and many small bridges swept away. Massachusetts reports two 800-ft. Connecticut River structures destroyed and four others weakened. In Maine eight bridges 191 to 378 ft. long over the Saco, four over the Androscoggin, two over the Kennebec, and 200 smaller bridges on secondary roads were destroyed.

The Maine Central R.R. was one of the early sufferers from flood waters, as noted last week. It lost its mainline bridge over the Androscoggin River in the floods of the second week in March. During the floods of the following week the damage to track and bridges and the stoppage of service due to submergence was general over all of New England and was very serious in western Pennsylvania and Maryland.

In New England the east-west lines of the Boston & Maine and Boston & Albany were crippled by the loss of bridges or track; similarly the Rutland, Vermont Central and the C. P. R. were badly crippled.

The New Haven R.R. suffered severely on its branch lines, but was able to maintain normal service continuously on its main "Shore Line" route between New York and Boston. Its most serious situation was caused by the rise of the Connecticut River to unprecedented heights, resulting in the necessity of cessation of service between Hartford and Springfield. The line which perhaps suffered worst of all was the Norwich and Worcester Branch, where because of necessity of rebuilding a dam and closing a dike before water can be diverted off the railroad, it is thought the line will be out of service for two or three weeks. At Webster, Mass., the New Haven tracks were dynamited by the town authorities.

Washington and the Potomac

By I. D. Foos
Washington Correspondent, Engineering News-Record

WASHINGTON'S flood reached a maximum stage of 18.5 ft. in the Potomac at Key Bridge on March 19. This was 1 ft. lower than the freshet of 1889, which inundated Pennsylvania Ave. The Potomac rushing down the gorge west of the city gave the 62-year-old Chain Bridge a terrific battering.

In its upper reaches the Potomac River during March 17 to 19 experienced its worst flood since 1889 and in places exceeded the flood heights of that year. Old highway bridges at Shepherdstown, Harper's Ferry and Point of Rocks went out, and the safety of several other old structures is questioned. At Harper's Ferry, where the 1889 flood reached a stage of 36 ft., this year's peak was 36.6 ft. on March 18, and the business district was flooded. At Hancock, Md., the water reached 47.5 ft., nearly 8 ft. above the 1889 stage of 39.7 ft.

Power, communication, transportation and water supply services were disrupted on both banks and extensive damage was done to business and residential properties in all river towns in Virginia, West Virginia and Maryland.

In Cumberland, Md., four banks were inundated, all stores were closed, and 1,000 residents were drive from their homes.

At many points the river has demolished the embankment separating it from the old Chesapeake & Ohio canal.

OLD BOLLMAN TRUSS over the Potomac at Harpers Ferry, Md., which went out shortly after this view was taken, removing a picturesque and historic landmark.

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March 26, 1936

Services Should Be Safe

AN IMPORTANT BYPRODUCT of last week's floods is the question raised by the failure of some city water supplies. Flood hardships are abruptly intensified to the crisis of emergency when the water gives out. Is this a necessary or unavoidable happening? Must the key-points of water service be exposed to such interruption? Gravity supplies from high upland sources are usually immune, and it is worth remarking that the disastrous experience of Johnstown would have been indescribably more tragic had not its mountain supply remained in action. But low-level supplies deserve equal security. Their filters and pumping stations ought to be safeguarded to make them as secure as the supply from high gravity sources. Additional cost may be involved, but no physical reason is apparent why effective protection cannot be provided. It should be made a primary principle of waterworks planning, in order that community disaster shall not make the water system its first point of attack. And, by the way, had the same principle been applied to power plants, the service failures at Hartford and Pittsburgh might have been avoided. Primary necessities of community existence ought to be fortified against breakdown in disaster with all the defensive skill at our command.

Old Dams Need Inspection

A BRILLIANT RECORD OF RESISTANCE was made by large dams in the floods. Not a single one gave serious cause for concern, though there was the usual crop of rumors about impending failures. Old dams did not fare so well, and for natural reasons: their age counts against them. Except in the case of the most substantial massive dams on assured rock foundation the passage of time tends to place both foundation and structure under suspicion; nor can spillway and outlet works be considered permanently safe unless frequently checked by competent inspection. Greenwood Dam at New Hartford, Conn., a wooden structure reputed to be nearly a hundred years old when it failed last week, was an obvious matter of public concern—proved by the houses and bridges destroyed in its failure. Why it stood as long as it did is a matter for speculation on the part of dam designers, yet it does not appear to have been under any form of public supervision. Connecticut appears to have no inspection of old dams, nor is such inspection practiced in many other states. California recognized the danger after the appalling St. Francis disaster, and learned that systematic and conscientious supervision of old dams by the public authorities is essential to control dangerous conditions. The citizens of no state can feel safe with less.

A.R.E.A. Manual

THE MANUAL OF APPROVED PRACTICE of the American Railway Engineering Association, extensively revised and assembled in loose-leaf form, is to appear some time during the present year. The present edition was published in normal book form in 1929, and supplements have been issued annually containing the revisions approved at each annual meeting since that date. In the new form the annual revisions can be substituted for the old material as soon as published, eliminating the tedious work of checking through several supplements to find the latest revisions of a particular section. Thus the change in form should add greatly to the usefulness and convenience of the material. Condensation and elimination of duplication also will improve the book. Acting under the urgent demand of President R. H. Ford, the association's committees during the past year went over their respective material in the manual to cull out unimportant matter, to condense verbose statements and to compose conflicts. A specially worthwhile change is elimination of specifications for materials concerning which other organizations such as the A.S.T.M. are better qualified to speak, substituting a reference to the appropriate source. All in all, the new manual has promise of being a useful and usable document.

A Significant Symbol

ENDING THE SERIES OF ARTICLES on industrial buildings the description in this issue of two windowless office buildings emphasizes a significant fact. It is that engineers and architects are finally subjecting industrial building design to a scrutiny free from any inhibitions of tradition. Furthermore, owners are lending encouragement to this new scientific approach, and that fact should contribute to its continuance. The windowless wall is merely a symbol of this new order of thinking. In itself it may or may not prove successful. Like other innovations it creates new problems even as it disposes of old ones. For example, more mortar joints must be kept weathertight. Efflorescence becomes a major hazard to exterior appearance. Heavier loads are imposed on the foundations and frame. Windowless buildings necessarily must be air-conditioned and lighted artifically, which creates wholly new problems. Finally, architectural treatment of facades becomes increasingly difficult. These problems, although probably more numerous than would be the case with a new type of floor, roof or frame, are nevertheless typical of what may be expected. If, however, a better building results, the departure is well worth trying. Already the new industrial building is off to a good start. If this basic approach to its design can be maintained, if new products and new methods can continue to be enthusiastically received, there is a good chance that the period just beginning may be one of quality as well as quantity production of industrial plant.

Rationalized Earth Dams

BY ONE OF THOSE COINCIDENCES that happen even in publishing, there appears in the present issue, simultaneously with accounts of the great floods in the Northeast states, a summary of advanced engineering procedure on the only comprehensive flood-protection project now under way. The Miami Conservancy work long stood as prime model; Muskingum soon will be its counterpart. On this work progress in the practical application of soil mechanics is attaining new heights. The engineering of these works has been rationalized by laboratory determination of soil permeability and consolidation that point to definite rules for controlling seepage and settlement. In particular new knowledge has been gained by the behavior of compressible and permeable earth foundations under embankment loads and water pressure. No more convincing evidence of

the service of the soils laboratory to the earth dam-builder can be found than appears in the history of experimentation at Muskingum which is set forth in the series of articles that begin in this isue. They present with authority a story of reasoned design based on research that has no equal in value since the pioneer work of R. R. Proctor on the dams for the Los Angeles water supply. The Muskingum flood-control operations carry all previous soil research forward into new fields of usefulness. Soil physicists as well as dambuilders will find new conviction of the value of the research that in barely a decade has built up a new art of construction.

Restore and Protect!

SURPASSING in its extent the Ohio floods of 23 years ago, the inundation that has just swept the North Atlantic region is one of the major catastrophes in the life of the nation. Its extraordinary character is expressed not only by the unprecedented flood heights reached but even more decisively by the magnitude of the area and the number of populous cities affected, by the paralysis of human activities and the utter disruption of communication. No one can remain in doubt as to the task it imposes: first to rebuild and restore, then to safeguard against recurrence.

Fortunately the flood was moderate in violence—the general rise of waters produced submergence rather than destructive scour. No less gratifying is the record of resistance made by modern structures, especially dams and bridges, and the success with which most public services were maintained. But the losses of the catastrophe are not to be measured in terms of structures or dollars only. Nor are they of merely local concern; the general welfare was too deeply affected. And because of this fact we must make sure that like havoc will not occur in the future.

Even without full details it is clear that much will be learned from the flood experiences. The unprecedented heights reached by many large rivers establish a better basis for foresight. Inadequate bridge clearances show the way to safer construction. Old dams that lack public supervision are seen to be a danger that ought not longer be tolerated. The vulnerability of community services, and the lack of control that permits residential areas and important industries to locate in a zone through which flood waters must flow, are recognized as hazards to the general security.

Floods are among the oldest of human experiences. Yet time after time in the past their destruction has been quickly forgotten, in lighthearted confidence that it would not be repeated. Only in the Miami Valley after 1913 and in one or two other localities has serious effort been made to provide permanent protection. Elsewhere the costly warning of flood havoc has been flouted with monotonous regularity. Denver, Columbus, Pittsburgh, and dozens of other communities remain exposed to repeated flooding; and, as last week's experience of the Conemaugh Valley proves, even the sacrifices in the great Johnstown disaster of 1889 were in vain.

There are many reasons why flood protection has remained inactive. Floods occur erratically, and usually (but not always!) at long intervals. The cost of adequate protection is often staggering, and so the easiest course is to ignore the counsel of caution. Moreover, the people who occupy stream channels and thereby intensify flood hazards object to being disturbed. Loose talk by forestry enthusiasts and contour-plowing fanatics further befogs the issue. Most weighty of all reasons, however, is the fact that the single owner is helpless against floods. Even a city or a county usually can do little, for most flood problems involve the whole length of a stream, indeed its whole drainage basin.

Flood protection, in short, is a regional problem. It crosses political boundaries, and thus falls in the shadow zone between independent and governmental jurisdictions. State governments, which have the primary responsibility and power to regulate floods, have been notoriously supine. The national government, which is involved through its authority over interstate waters, is limited to power over commerce, which means navigation, and has consistently refrained even from requiring flood channels to be kept clear.

Thus, as we confront the question of what must and can be done about floods, we recognize that it calls for radically new organization—a cooperative system of a type not yet created. It is an urgent task to devise and create such organization and to forestall the danger of having the problem thrown wholly on the federal government.

Already state officials are asking the government for scores of millions for reconstruction and flood control. Yet if flood protection is to make any consistent progress it must be through local initiative and responsibility, not through dependence on the federal government or logrolling for funds out of the national treasury. Organization of a cooperative attack on the flood problem by state and federal governments conjoined is the only direct road to effective flood protection.

More than organization is needed, however, for knowledge of basic flood data is sadly deficient, and planning cannot go far until it is provided. No flood protection plans are in existence—and let it be recognized clearly that flood protection is anything but a WPA cleanup job; it is engineering construction of the most formidable kind. Accordingly, surveys and studies have to be made; penetrating research on which reliable forecasts of future great floods can be based is needed in all parts of the country.

This also must essentially be cooperative work between states and the nation; but here the federal government has the superior equipment—in the organizations of the army engineers with their river study staffs, the water resources branch of the Geological Survey, which has long studied floods, and the new but highly able Water Resources Committee. These agencies, if joined in an independent commission free from bureau traditions, are prepared to organize quickly a competent and broad study of data on which secure flood protection planning may rest.

For dealing with purely intrastate problems Ohio showed the way 20 years ago in the conservancy district act that was passed to meet the needs of the Miami Valley people. Such organization for regional protective work has been proved to be practicable and efficient. It needs only to carry this procedure farther and coordinate it with the operations on larger streams that must be initiated by the states direct, with federal cooperation.

In summary: The floods of the Northeastern Region emphasize the commanding need for active flood protection work. They reveal more clearly than before that it is a regional problem, in which the states have a leading part. And they show once again that unless we safeguard our river communities and their services against great as well as small floods the menace of flood disruption is an ever-present danger to secure existence.

CURRENT NEWS

Savannah River Project Approved

Special engineering board approves power and navigation development and recommends early construction

APPROVAL of a proposed flood control, navigation and power development on the Savannah River, which forms the boundary between Georgia and South Carolina, has been given by a special board of engineers appointed to study the desirability of the proposed work. The report also recommended immediate construction of the project which is expected to cost about $21,000,000.

The proposed development, which would be located at Clark Hill, about 20 miles from Augusta, calls for the construction of a concrete gravity dam and a power house. The reservoir created would extend about 37 miles up the river and would provide ample water for year-round navigation between Augusta and Savannah. About 60,000 acres of land would be acquired for the project, and of these 36,000 would be cleared for the reservoir.

In making its report the special board, which was composed of Col. Earl I. Brown, Corps of Engineers; Sherman M. Woodward, consultant to the National Resources Committee, and R. N. McWhorter, chief engineer, Federal Power Commission, suggested four alternative plans for the administration of the work. Two of the proposed plans contemplate construction by the federal government; one plan proposed cooperation between the federal government and the states of South Carolina and Georgia, and the other plan proposed an administrative agency similar to the Tennessee Valley Authority. The report further recommended that the project be constructed as soon as practicable for the benefit of navigation, flood control and development of power. It was held, however, by the report, that immediate construction could be undertaken only if the federal government assumed control of the project, as legislative sanction would be necessary in South Carolina and new legislation would probably be necessary in Georgia.

Estimated cost of the project was divided as follows: Navigation, $4,360,000; Stevens Creek project, $1,042,000; flood control $100,000; Augusta canal project $67,000; primary power $14,600,000, and secondary power $776,000.

New Personnel Appointed to Allegheny County Authority

Soon after the appointment in Pittsburgh of new officers for the Allegheny County Authority, Administrator Ickes announced that he would move to rescind the $24,500,000 allocation for the Pittsburgh PWA projects if Allegheny County authorities do not submit by April 1 their proposed new contract curtailing their plans and eliminating tolls on the projected bridges.

Each of the new officers holds a county office, thus integrating this quasi-public corporation, set up to handle the county PWA program, more closely with the existing county organization. The new officers are J. F. Laboon, chairman, who is also director of the County Department of Works; Henry Hornbostel, vice chairman, who is also director of parks and aviation; Park H. Martin, secretary, also director of the planning commission; and Harry T. Aufderheide, treasurer, also director of property and supplies. These officers replace Samuel Eckels, chairman; John M. Rice, vice chairman; and William McK. Reed, secretary-treasurer.

Floods

Reports on flood developments during the past week in the Northeastern states together with such hydrological data as are available are presented on pages 441-446 and pages 466-469 of this issue.

Freight Rates on Lumber Lowered by New York State

A decision that freight rates on lumber and forest products, proposed by railroad companies for New York state, are not justified has been handed down by the New York State Public Service Commission and the companies have been ordered to cancel the rates which have been under suspension during proceedings conducted by the commission.

The proceeding represented a phase of a general revision of lumber rates throughout the "Official" or eastern territory as published in tariffs filed to become effective Oct. 1, 1934. These tariffs proposed to cancel the existing commodity rates on lumber, which upon protest of interested shippers and at the request of the carriers themselves, had been suspended. Under the new order the sixth class rates, 27½ per cent of the first class rate, will apply.

The Interstate Commerce Commission and the Public Service Commission of Pennsylvania suspended similar tariffs filed with them and the proceedings before the three commissions were heard jointly. The suspended schedules further proposed to increase the minimum weight on lumber to 36,000 lb., instead of the present 34,000 lb. The commission found that the proposal to reapply the first class rate would substantially increase the cost of lumber and that the carriers had not shown the reasonableness of such increased rates and, therefore, ordered the cancellation of the proposed higher rates.

Lafayette Celebrates Engineering Service

Seventy years of engineering at Lafayette College marked by meeting and exhibition of progress

A SPECIAL CELEBRATION on March 20 signalized the 70th anniversary of the inception of engineering courses at Lafayette College, Easton, Pa. Several prominent speakers took part in the program which was concluded by a dinner at which 140 were present. An exhibition of manufacturing processes and products, and also scientific experiments was arranged to run for four days as part of the celebration. Between 7,000 and 10,000 persons viewed these exhibits.

At a special convocation Dr. William Shafer Hall, Professor Emeritus of Mathematics, and for more than fifty-one years a member of the engineering faculty, delivered an address entitled "Seventy Years of Engineering at Lafayette," in which he traced the origin, founding and development of engineering at the college, and the achievements of her alumni. The principal address was delivered by Charles F. Kettering, president, General Motors Research Corp., on the topic "What's Ahead in Engineering."

Mr. Kettering pointed out in his talk that "We are entering into a very great rennaissance in the development of all useful things—the sooner we can recognize that we can obsolesce everything in this country, the sooner we'll all have a lot to do and have a grand future ahead of us—the engineer has depended upon his slide rule too long. He must learn to get a job done in a common sense way. Engineering must be recognized as one of the important things of all industry."

Honorary degrees of Doctor of Science were conferred upon Mr. Kettering, Almon H. Fuller, head of the Department of Civil Engineering, Iowa State College, and George S. Rice, Chief Mining Engineer, U. S. Bureau of Mines.

A conference was held on the place of the engineer in the modern world. Addresses were delivered by Dr. Almon H. Fuller on the subject "The College Training of the Engineer," and by Dr. Robert I. Rees, vice-president, American Telephone and Telegraph Co., on the subject "The Professional Training and Recognition of the Engineer." Another address was given by S. A. Downey, civilian engineer attached to the Corps of Engineers, in charge of flood control surveys along the Lehigh River.

A bronze tablet was unveiled at Gayley Hall of Chemistry in memory of Harrison Woodhull Crosby, who developed the use of hermetically sealed tin containers for food in 1847 at Lafayette. For the occasion, Dr. E. J. Cameron, assistant director, National Canners' Research Laboratories made an address entitled "Development of the Canning Industry."

Portraits of Rossiter Worthington Ray-

mond and Thomas Messinger Drown, nationally known figures in the mining engineering world, and former professors on the engineering faculty of the college, were unveiled in the John Markle Mining Engineering Hall.

The celebration was concluded by a dinner and an address by Col. Willard Chevalier, vice-president, McGraw-Hill Publishing Co., entitled "An Engineer Takes a Look at Current Trends."

As a part of the celebration, an engineering and industrial exhibition was arranged in the Alumni Memorial Gymnasium and Markle Hall, open to the public from March 18-21. Working models illustrating manufacturing processes, exhibits of new products, scientific instruments and experiments as well as motion pictures of engineering operations by some thirty nationally known manufacturers were viewed by an attendance estimated from 7,000 to 10,000.

Federal Pollution Laws Held Undesirable at Hearing

Blanket federal legislation for coping with the problem of stream pollution is undesirable, since no two streams in the country are alike as to flow, topography or use, according to a statement by Abel Wolman, of the National Resources Committee, speaking before a sub-committee of the Senate at the hearing on Senator Lonergan's anti-stream-pollution measures.

State action in dealing with stream pollution was favored by a number of speakers at the hearing. Grants in aid of treatment plants as well as assistance to all efforts now being made within state lines to handle pollution were recommended.

The speakers testifying before the subcommittee laid stress on the statement that there is no known generalized system for handling pollution, and added that it was doubtful that one could be evolved.

The cost of clearing the domestic pollution from American streams was said to be at least $1,000,000,000 while the price for ridding the water courses of industrial waste would be from three to five times that amount.

New Agreement Will Speed Work on Provo River Project

The Bureau of Reclamation will commence work in the near future on the Provo River project in Utah under an arrangement, approved by Secretary Ickes, eliminating the projected 5.54-mile tunnel to divert water from the Duchesne River into the proposed Deer Creek reservoir. The metropolitan water district of Salt Lake City which has originally sought a supplementary water supply from the reservoir has been unable to reach a final decision on its participation, thus permitting elimination of the tunnel. Without the feeder tunnel, about 68,000 acre-ft. will be developed annually for use on the Provo irrigation project. If Salt Lake City desires to participate in the future, the tunnel can be built at that time, if the water has not been put to use elsewhere in the meantime. Under the new plan, the total cost of the Provo River project will be about $7,900,000, and that of the Deer Creek Division, $4,800,000. Studies are under way on the Deer Creek dam site and preliminary designs are in progress.

WPA Gets Flood Repair Funds

Definite flood control policy seen likely as President allots $43,000,000 for rehabilitation—WPA officials and Army engineers survey stricken areas to appraise damages—Flood aid appropriations introduced in Congress

Washington Correspondence

PRESIDENT ROOSEVELT'S allotment of $43,000,000 for flood rehabilitation vests WPA with blanket authority to undertake repair or replacement of any publicly-owned property or utilities which have been destroyed or damaged, including roads, streets, bridges, sewers, water and electric plants. The emergency allotment includes $18,400,000 that had been set aside for this purpose in February.

The flood-stricken states are clamoring for funds. Governor Earle, of Pennsylvania, has asked for $10,000,000 for that state alone—$5,000,000 for WPA work and $5,000,000 for direct relief, and a special session of the Pennsylvania legislature probably will be called to appropriate money to supplement federal funds. Rep. Connery introduced a resolution appropriating $10,000,000 for flood relief in Massachusetts.

Damage appraisals started

Reports received in Washington state that the 250,000 WPA workers that have been thrown into the breach are effectively coping with the immediate situation. Deputy WPA Administrator Lawrence Westbrook left Washington, March 23 for Hartford, Conn., to survey conditions in that state. Several WPA officials have been assigned to inspect other flood devastated districts: Deputy Administrator Howard O. Hunter has been assigned to Springfield, Mass.; Deputy Administrator Thad Holt to Wheeling, W. Va.; Col. F. C. Harrington, to Johnstown and Pittsburgh; Deputy Administrator Corrington Gill to Portsmouth and Cincinnati; Col. Ernest D. Peake, WPA regional engineer for New York, to Binghamton, N. Y.; Francis H. Dryden, Maryland WPA administrator to Easton and Wilkes-Barre, Pa. Mr. Hunter is in direct charge of all flood relief.

PWA state directors and state engineer inspectors were instructed by Horatio Hackett, Assistant Administrator, to survey damages caused by floods to PWA projects, particularly bridges, roads and public buildings, with an estimate of the funds required for repair. Field officials also were asked to report other flood damages on which it would seem appropriate that PWA participate in rehabilitation.

Lt. Col. G. E. Edgerton, assistant chief of engineers, was ordered to Harrisburg, Pa., to survey conditions in eastern Pennsylvania and New York. The division engineer at New York, Col. George R. Spalding, was instructed to make similar investigation in the New England states and the division engineer in Ohio, Col. Roger G. Powell, to report on conditions in the Ohio River Valley. The purpose of these surveys is to determine with some accuracy the extent of damage so that legislation carrying appropriations for the construction of preventive works may bear some relation to the facts.

Congressional action

Congressmen from the twelve flood-stricken states caucused on March 23 to debate relief, reconstruction and flood control plans. Rep. Riley Wilson, of Louisiana, chairman of the House Flood Control Committee, presided at the meeting in which sentiment was strongly in favor of cutting legislative red tape in order to speed flood control work. Wilson stated that his committee had reported a bill, now lying on the House calendar, authorizing an organized agency, preferably the War Department, to spend $604,000,000 on flood control surveys and projects. Under this bill the Secretary of War would be unencumbered in undertaking surveys and carrying out projects approved by the army engineers without delay.

Senator White will introduce a resolution calling for re-examination by the Corps of Engineers of its 1930 report on flood control survey in Maine. A congressional delegation informed Secretary Dern that areas in which the Corps held no flood control works were necessary were disastrously flooded last week by the Kennebec, Penobscot and Androscoggin Rivers.

The Senate also added $10,000,000 for soil conservation and flood control in passing the Department of Agriculture appropriation bill on March 24. The resolution, sponsored by a congressional committee representing flood stricken states, for appointment of a joint Senate and House committee to submit a comprehensive flood control program this session was referred to the Rules Committee. The special committee would have power to subpoena witnesses and obtain all flood control data now in the hands of the federal government.

Definite flood control plan likely

Adoption of a definite policy by the federal government with respect to flood control is likely to result from the present disaster, the occurrence of which in several areas is ascribed by many legislators and government officials to the lack of such a policy in the past. Senator Copeland recently introduced a bill that declared that flood control is a proper activity of the federal government, and that improvements of rivers and other waterways for flood-control purposes are in the interest of the general welfare. It provides that federal investigations and improvements of rivers and other waterways for flood control and other purposes shall be under the jurisdiction of and prosecuted by the War Department under the supervision of the Chief of Engineers except as otherwise specifically provided by act of Congress.

No estimate of damage

No attempt was made in Washington to put any comprehensive estimate upon the amount of repair and replacement work necessary on railroads, highways, bridges, power, light, gas, water, and sewage plants. Many communities are hopeful that another appropriation will be made to PWA to finance non-federal projects which the emergency will force them to undertake. In recommending an appropriation of $1,500,000,000 for continuing the WPA work relief program, President Roosevelt excluded PWA. According to the President's estimates $3,100,000,000 will be available for the work relief program in the fiscal year

commencing July 1 next, as compared to estimated expenditures of $3,500,000,000 in the current fiscal year.

Pittsburgh's experience probably will dictate engineering revision of the extensive bridge and highway projects in Allegheny County for which an allotment of $24,500,000 has been standing on PWA books for the past two years. Originally sponsored by the Allegheny County Authority and now taken over by Allegheny County, the plan was still bogged down in local politics when the Allegheny and Monongahela Rivers reached the highest stages on record.

Stay Granted Power Company in Buzzard's Roost Case

As a step in bringing the Buzzard's Roost case before the United States Supreme Court, the Duke Power Co. has applied for, and has been granted a stay of mandate from the Circuit Court of Appeals, which on Feb. 22 refused an injunction and declared that the PWA was acting constitutionally in granting funds for the building of a hydroelectric plant at Buzzard's Roost in South Carolina.

The right of the PWA to make a combined loan and grant of $2,800,000 to Greenwood County, S. C., for construction of a publicly owned hydroelectric plant on the Saluda River was denied in a federal district court on Dec. 23. The case was then appealed and a decision by the court upheld the right of the county to build the plant with PWA funds (*ENR*, Feb. 27, 1936, p. 330).

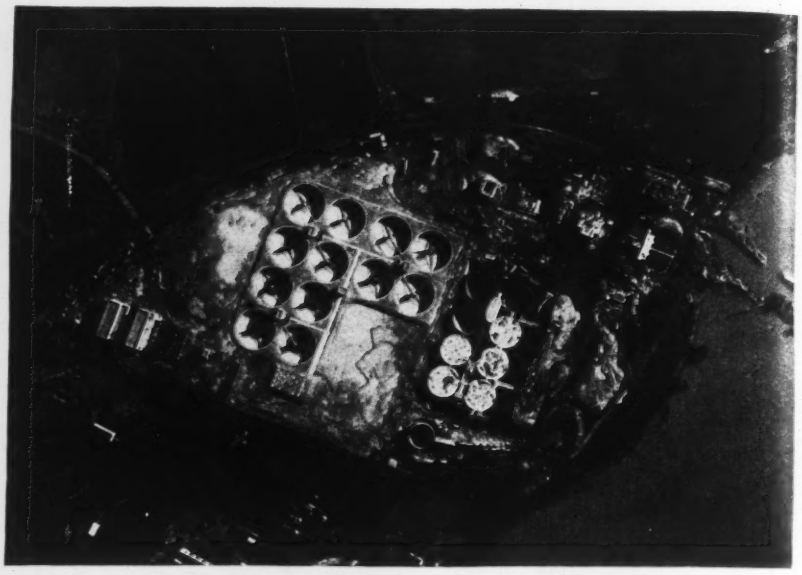
Funds for Newark Projects Rescinded by PWA

Allotments totalling $5,121,817 that had previously been made to Newark, N. J., for the construction of a hospital and a high school were rescinded by the PWA on March 20 because the city had failed to approve an ordinance providing for the sale of bonds to secure the loan portions of the allotment. It was also stated that the possibility of getting construction started before April 15 was one reason for the rescission of the allotment. The new city hospital was to have been built at a cost of $3,090,909, of which $1,700,000 was to have been a loan and the rest a grant. The school program was to have included the building of a new high school and the making of alterations and additions to three other school buildings at a total cost of $2,030,908, of which $1,117,000 was to have been a loan. When the allotment was originally made Dec. 15, 1935, was set as the date for beginning work. This, however, was later extended until April 15, 1936.

Funds Rescinded For Study of Gunnison River Diversion

An allotment of $100,000 for a study, by the Bureau of Reclamation of the proposal to divert water from the Gunnison River to the Arkansas Valley in Colorado has been rescinded because it was disapproved by President Roosevelt. Secretary Ickes said that before the feasibility of specific diversion projects is investigated, the government ought to determine on a policy of how far it should go in transferring water from one watershed to another. The Bureau of Reclamation was authorized by Secretary Ickes on March 13 to undertake an investigation of the proposed transmountain diversion of waters of the Gunnison River. The sum of $100,000 had been transferred from other unused Bureau of Reclamation investigation accounts to finance the diversion study.

John C. Page, Acting Commissioner of Reclamation, said at that time that the Arkansas Valley in Colorado suffered from severe and disastrous drought conditions because of an acute shortage of water, and that the investigation would determine how much water would be available in the Gunnison River near its headwaters for transfer and what the cost of the diversion works would be. Such a study would determine the feasibility of the project.



DISPOSAL PLANT FOR THE DISTRICT OF COLUMBIA

Aerial photograph of the sewage treatment plant, for the District of Columbia, now under construction. Estimated to cost $4,000,000, the plant is designed to treat an average sewage flow of 130 m.g.d. from a tributary population of 650,000. The plant comprises a sewage pumping station, shown in the left foreground, grit chambers, grease separators, twelve sedimentation tanks with mechanical sludge collectors, eight covered sludge digestion tanks, sludge elutriation tanks, sludge dewatering building, power plant building and administration building.

The clarified sewage will be discharged through two 90-in. reinforced concrete pipe lines (located under water in the upper right corner of the photograph) 1,000 ft. out into the channel of the Potomac River. The sludge, after being washed with water in the elutriation tanks, will be treated with chemicals and dewatered on vacuum drum filters.

In 1934 PWA allotted a combined loan and grant of $8,000,000 for an activated sludge plant. Later the activated sludge treatment was discarded in favor of the present sedimentation plant and the loan and grant was subsequently reduced to $4,000,000. (*ENR*, July 5, 1934, p. 23 and Nov. 8, 1934, p. 608). Metcalf & Eddy, of Boston, Mass., are the engineers.

Detroit Engineers Form Society

The incorporation of a new engineering society in Detroit was authorized at a meeting of more than 50 engineers who attended a meeting on March 17. The new society is to be known as the Engineering Society of Detroit and plans are being formulated for permanent headquarters and for meetings of officers and members. Members selected for the initial board of directors include E. J. Burdick, W. D. Cameron, C. W. Ditchy, H. S. Ellington, M. R. Fisher, J. H. Hunt, J. W. Parker, C. R. Paton and David Segal.

PWA Project Engineers To Report to State Directors

Project engineers on sixteen PWA projects are instructed by a new administrative order to report to state PWA directors instead of direct to Washington. The object of the order, as explained by Administrator Ickes, is to extend PWA's policy of decentralization. The order does not limit in any way the authority or functions of the project engineers. Only projects to which project engineers have been assigned are affected by the order. The list of sixteen includes the Triborough Bridge in New York.

Inclusion of this project has revived the old controversy between Administrator Ickes and Robert Moses, Commissioner of Parks, New York City. Mr. Ickes asserted, March 24, that the order would have been issued had there been no Triborough Bridge. He is just as anxious as anyone, he said, that construction of the bridge be completed by July 1, pointing out that the contract had called for completion by Sept. 1, 1935. Mr. Ickes said that the order does not abridge the authority of Wharton Green, the project engineer, in any respect and that the reputation, qualifications and record of Arthur Tuttle, state PWA director, to whom Mr. Green will report in the future, are beyond criticism. Mr. Ickes said that any protest from Mr. Moses would receive respectful consideration but that he "does not yield to Mr. Moses the right to run the PWA any more than I would attempt to dictate to him on matters within his own authority."

Bridge Engineering Association To Meet in Berlin

The International Association for Bridge and Structural Engineering will hold its second international congress in Berlin, Germany, from Oct. 1-8, 1936. Invitations will be sent out this month and will contain a preliminary list of the reports and contributions to the discussion. The following subjects will be discussed: Importance of the toughness of steel in statically indeterminate structures; stressing and degree of safety in reinforced concrete structures; questions in connection with welded steel structures including influence of dynamic and frequently alternating loading; concrete and reinforced concrete in hydraulic engineering and research concerning building ground.

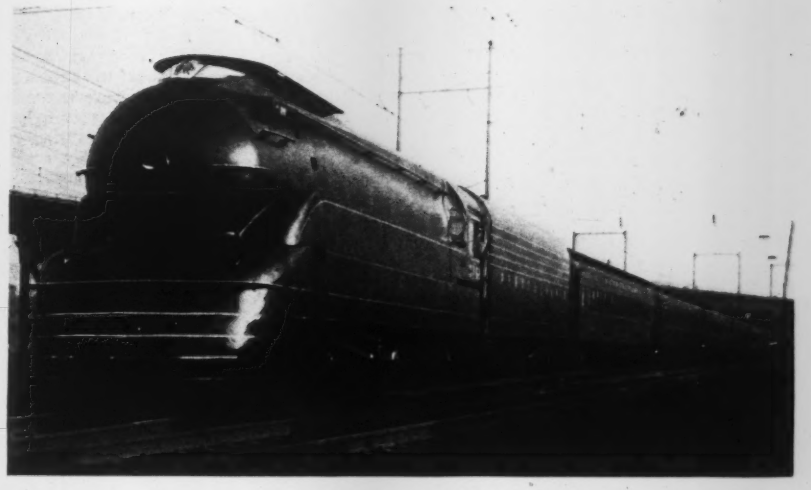
National Water Plan To Be Drafted

A national water plan directed to the control of floods, erosion and water pollution; to the uses of water for domestic purposes, irrigation and power; and to drainage of water-logged and over-flowed lands, will be delivered to President Roosevelt before Dec. 1 by the National Resources Committee, according to reports from Washington on March 25. The request for the plan came to the Resources Committee several weeks before the recent floods. It will embrace recommendations for long-range development of each important drainage basin in the United States and list projects essential to its execution. The study is in line with the general recommendations made in the committee's report of December, 1934, and transmitted to Congress by the President Jan. 24, 1935.

Recognizing the vital necessity of a national flood control program at a time when the eastern half of the United States is suffering the effects of one of the most generally disastrous series of floods in history, the Water Resources Committee of the National Resources Committee is hastening its efforts to bring a developed program of flood control into relationship with a comprehensive program for the better conservation and use of all waters.

Under a newly appointed director and assistant director, the Water Resources Committee is assigning seventeen consultants to work with state and regional planning boards and to get the views of state authorities regarding the needs of various sections of the country. These consultants will be responsible for the conduct of the field work necessary for the preparation of the water plan in groups of states, those groups being selected according to major drainage areas.

The director of the study is Frederick H. Fowler, San Francisco, a member of the American Society of Civil Engineers' committee on flood control data, a consultant on flood problems for Los Angeles and Kansas City, and a former member of the Technical Board of Review of PWA. The assistant director is Merton L. Emerson, Boston, a consulting engineer and also former member of the Technical Board of Review. The Water Resources Committee, through its membership, will outline and conduct the study through the special organization which has been set up under Mr. Fowler's general direction.



PENNSYLVANIA RAILROAD'S STREAM-LINED LOCOMOTIVE

This steam locomotive recently completed by the Pennsylvania R.R. at the Altoona, Pa., shops, presents advanced aerodynamic design for the reduction of wind resistance. A device, modeled on the principle of an airplane wing, deflects the smoke upward so as to clear the locomotive and train.

The design of this engine was produced by the railroad's engineering staff and consulting technical advisers. Details were worked out in a series of wind tunnel tests in the laboratory of New York University. In these tests clay models were used instead of wood or other material, making it possible to change the shapes and contours immediately following the observation of each test. The new engine is intended for high speed passenger service.

The Pennsylvania R.R. now operates three types of streamlined locomotives. In addition to the new steam locomotive shown here, 58 electric engines, known as the GG-1 type, and 28 known as the P5a type, are in operation between New York and Washington.

Commission Issues Truck Rates For California

After public hearings, conducted at San Francisco and Los Angeles, with testimony from hundreds of witnesses, the Railroad Commission of California issued an order on March 9 prescribing minimum rates to be applied to transportation, in dump trucks, of rock, sand, gravel, excavation material and road building material.

This is one of a number of orders the commission has issued prescribing minimum rates for truck operators pursuant to authority, granted by the state legislature, which gives control over highway contract carriers, radial highway common carriers and city carriers as defined in the Highway Carriers Act enacted by the 1935 legislature.

The dump truck rates set forth in the order become effective March 29 and thereafter it will be illegal for all dump truck operators to charge and collect less than the rates prescribed.

In the southern part of the state the rates are prescribed on both hourly and ton-mile basis, while in the northern part of the state the rates are set on an hourly basis with a graduated schedule for different sizes of equipment.

A. S. C. E. Regional Meeting Planned for Columbus

A regional meeting of the American Society of Civil Engineers in Columbus, Ohio, May 15 and 16 is being sponsored by the Central-Ohio Section.

The region included is expected to embrace all of district No. 9, comprising most of Ohio and Kentucky and all of Indiana. The program, for the most part, will be concerned with a consideration of the larger public works, constructed under the PWA program, being carried on in Columbus. This includes, among other things, the new sewage disposal plant, an extensive sewer program, several bridges, refuse incineration and the WPA traffic survey.

First of these regional meetings was the one held under the sponsorship of the Cleveland Section at Zanesville, Ohio, on October 4 and 5, 1935. The program at that meeting concerned itself with the Muskingum Valley Conservancy work.

American Engineering Council Rearranges Committee Work

Because of the large increase in the number of members of the American Engineering Council the executive comittee of the American Engineering Council has regrouped all committees so as to simplify the understanding of the major objectives. All committees have been grouped under four major headings: the committee on public affairs, the committee on engineering-economics, the committee on programs for united action of member organizations, and the American Engineering Council operating committees. The committee on public affairs has two new committees included under this new set-up. The activities of three earlier committees are combined in a new committee on conservation and utilization of natural resources. The other new group is a committee on surveys and maps. The committee on engineering-economics is divided into two subcommittees and the committee on programs for united action of member organizations has four subdivisions.

Contractors Code Authority To be Formally Dissolved

Formal action looking to the dissolution of the Divisional Code Authority for General Contractors, Inc., was taken March 12 by the board of directors of the corporation, meeting at Washington, when it was voted to proceed toward turning the corporation back to the state of Delaware, in accordance with the laws of that state, under which the Divisional Code Authority was chartered. Final action requesting the appointment of trustees to handle all of the remaining assets of the corporation, under the supervision of the courts, is anticipated at the next meting of the board of directors, tentatively set for April 27, at Washington.

For the last ten months, since the Supreme Court decision invalidating NRA, the Divisional Code Authority for General Contractors, Inc., has proceeded, in strict accordance with the laws of each particular state, to withdraw from the various states in which the corporation had been domesticated. This routine has now been accomplished and the records placed in order so that they are available for use.

There now remain before the corporation only minor details in regard to winding up its affairs, and it was therefore decided to take the necessary steps toward dissolution.

President Appoints Committee To Study Agency Reorganization

Louis Brownlow, director of the Public Administration Clearing House of Chicago, has been chosen by President Roosevelt to be chairman of a committee to cooperate in a study of better reorganization of the executive departments and independent agencies. With Mr. Brownlow on the committee are Charles Merriman, of the University of Chicago, and Luther H. Gulick, specialist in government research. President Roosevelt suggests that this committee, which will serve without pay, could cooperate with a Senate committee headed by Harry F. Byrd of Virginia. The President also suggests that a special committee of the House of Representatives be formed in this same connection.

Chicago River Control Plans Given Approval

Plans by the Sanitary District of Chicago for controlling works at the mouth of the Chicago River were approved by the Secretary of War on March 15. The proposed structure will consist of a lock having a clear width of 80 ft. and a clear length of 600 ft. It will be located about 1,800 ft. east of the Outer Drive bridge and the lock walls will be parallel to the Navy Pier. The sills of the lock are to be 23 ft. below the Lake Michigan low water datum.

Construction of the proposed controlling works will constitute a step in the fulfillment of the obligations imposed upon the state of Illinois and the Sanitary District of Chicago by the Supreme Court, which in 1930 decreed that the Chicago Sanitary District was required to reduce the annual average diversion of water from Lake Michigan through the drainage canal to an amount not in excess of 5,000 sec.-ft. during the years 1935-1938, after which time it could not divert water in excess of 1,500 sec.-ft. Control works are necessary at the mouth of the river in order to prevent reversal of the river in times of storm. Plans for control works have been revised several times because of objections raised by navigation interests, property owners and the War Department.

Canada Plans New Harbor Board

Legislation for the centralizing of control of Canada's seven major salt water ports, and the abolition of the boards of commissioners who have up to the present administered these ports, following generally the lines of the Gibb Report on the National Ports of Canada was introduced into the federal House of Commons, on March 19, by C. D. Howe, Minister of Marine. Twenty existing acts of parliament will be replaced by the new legislation when it is passed. The bill would create a National Harbor Board consisting of three members.

SOCIETY CALENDAR

AMERICAN CERAMIC SOCIETY, annual meeting, Columbus, Ohio, March 29-April 4.

FEDERATION OF ARCHITECTS, ENGINEERS, CHEMISTS AND TECHNICIANS, annual convention, Rochester, N. Y., April 17-19.

CONCRETE REINFORCING STEEL INSTITUTE, annual meeting, Hot Springs, Va., April 20-22.

MIDWEST POWER ENGINEERING CONFERENCE, Chicago, Ill., April 20-24.

AMERICAN SOCIETY OF CIVIL ENGINEERS, spring meeting, Hot Springs, Ark., April 22-24.

AMERICAN WATER WORKS ASSOCIATION, annual meeting, Los Angeles, Calif., June 8-12.

SOCIETY FOR PROMOTION OF ENGINEERING EDUCATION, annual meeting, Madison, Wis., June 23-26.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

PUBLIC WORKS CONGRESS, joint meeting, AMERICAN SOCIETY OF MUNICIPAL ENGINEERS AND INTERNATIONAL ASSOCIATION OF PUBLIC WORKS OFFICIALS, Toronto, Ont., September 28-30.

CANADIAN SECTION, AMERICAN WATER WORKS ASSOCIATION, Hamilton, Lafayette, Ind., April 7-9.

INDIANA SECTION, AMERICAN WATER WORKS ASSOCIATION, annual convention, Ont., April 1-3.

ILLINOIS SECTION, AMERICAN WATER WORKS ASSOCIATION, annual convention, Evanston, Ill., April 10-11.

NEW ENGLAND BUILDING OFFICIALS CONFERENCE, annual meeting, Boston, Mass., April 20-22.

METROPOLITAN SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS, at its monthly meeting held in New York City, March 18, discussed sewage treatment in New York City. The principal paper was prepared by Walter D. Binger, deputy commissioner of the Department of Sanitation and Richard H. Gould, chief engineer of the department. The paper was presented by Mr. Binger. Among those who discussed the paper were Arthur S. Tuttle, former chief engineer of the board of estimate of the city, Sol Pincus, deputy commissioner of the department of health, and George A. Soper, engineer of the former Metropolitan Sewerage Commission. The paper reviewed the background of the work now in hand, summarized the present accomplishments and outlined future plans.

Peter Grimm Resigns As Housing Coordinator

Peter Grimm, Coordinator of Federal Housing activities, has resigned that position to return to his own business activities. Mr. Grimm, who has completed his work of coordinating the activities of 52 housing agencies, presented to President Roosevelt a report on housing needs and suggested methods of meeting them. Mr. Grimm had been appointed to a post in the Treasury Department as a special assistant to Secretary Morgenthau and has been active in developing a program embracing subsidized slum clearance and stimulation of private construction. It is understood that J. M. Daiger, co-drafter of the Federal Housing Act of 1933, has been appointed to represent various housing agencies and to coordinate proposed legislation.

Proposed Amendments Would Expand RFC Act

Amendments to the Reconstruction Finance Corporation Act to set up $25,000,000 as loans to manufacturing concerns for repair and replacement of structures, machinery and equipment, without the same restrictions as imposed by the present law is proposed by Senators Walsh, of Massachusetts and Lonergan, of Connecticut. Farmers and home owners also would be eligible. The law now requires that present liens must be subordinated and limits loans to repair and replacement of buildings and structures. Prospects for enactment of the expansive amendment are considered favorable.

Personals

A. J. FOOTE has been appointed town engineer and highway superintendent for the town of Mamaroneck, Westchester County, N. Y.

PAUL L. HOLLAND, chief engineer of the Maryland Public Service Commission, has been elected senior vice-chairman of the Baltimore Safety Council.

J. P. LURTON has been appointed city engineer of Pueblo, Colo., succeeding D. P. GAYMON, who has held that office for the past 27 years.

W. A. BURNHAM, formerly senior engineer, has been appointed as superintendent of the ECW Camp in Saguaro Forest State Park, Tucson, Ariz.

The Rhode Island State College, Kingston, R. I., has announced the appointment of PROFESSOR WESLEY B. HALL as head of the department of electrical engineering. Professor Hall graduated from Yale University in 1916 and has been an instructor there since 1919.

H. C. WHITTLESEY, for the past two years senior structural engineer, California State Division of Architecture, has left that position to return to private practice as consulting structural engineer.

WALTER M. STONE has been appointed chief engineer examiner for the PWA in Massachusetts, succeeding Stephen W. Smith. He has been assistant chief engineer since 1933 and was formerly connected with Stone & Webster and J. R. Worcester at Boston.

Obituary

JAMES A. DEARBORN, head of the Dearborn Contracting Co., railroad bridge builders, died March 16 at his home in Brookline, Mass.

WILLIAM H. CARTER, 57 years of age, mayor of Santa Monica, Calif., for the last five years, died March 13. He was president of the Los Angeles County League of Municipalities, a director of the Metropolitan Water District of Southern California and for many years had held various engineering and public offices in Southern California. In 1910 he was assistant street superintendent in Santa Monica, then superintendent and later was elected commissioner of public works, which post he held for three terms.

J. A. CASHION, former president of Grant Bros. Construction Co., contractors on the Santa Fe Railroad lines west from Kansas City, died March 19 in Los Angeles. After the completion of the Santa Fe road, Mr. Cashion's firm was engaged in building the Southern Pacific line down the west coast of Mexico.

GEORGE GORDON CRAWFORD, 66, retired steel executive, died March 20 in Birmingham, Ala., after an illness of several months. For 23 years he was president of the Tennessee Coal, Iron and Railroad Co., a subsidiary of U. S. Steel, and served as president of Jones and Laughlin Steel Corp. from 1930-1934. He was a former director of the American Iron and Steel Institute.

MORRISON CLARK HAMILTON, a leader in the construction engineering field for many years, died at his home in Hartford, Conn., March 15. He was 78 years old. Mr. Hamilton started in 1880 with the Pennsylvania Railroad as a civil engineer, and was later associated with the Consolidated Railroad, the New York subway system and the New Haven Railroad. He worked on outstanding projects in Connecticut and New York, including the Clark Dike in Hartford, the Housatonic River Dam above Ansonia, and the dam in Woodbridge.

CONSTRUCTION STATISTICS FOR THE WEEK

ENGINEERING CONSTRUCTION volume registers $34,111,000 for the week compared with $33,606,000 last week and $18,584,000 last year. This week's total is made up of private, $12,885,000 and public, $21,226,000 of which federal is $307,000 and state and municipal, $20,919,000. Corresponding values a year ago are: private, $4,623,000; public, $13,961,000; federal, $2,035,000 and state and municipal, $11,926,000.

Waterworks, bridges and unclassified projects show a gain over last week, sewerage and earthwork and waterways a loss, other classifications are about even. The values for this week are: commercial buildings, $4,582,000; industrial buildings, $4,416,000; public buildings, $3,171,000; streets and roads, $8,013,000; bridges, $4,149,000; sewerage, $1,676,000; waterworks, $1,975,000; earthwork and drainage, $130,000; unclassified, $5,999,000.

The larger projects include: gas holder for Ford Motor Co., River Rouge, Mich., $1,000,000; sugar refinery for Spreckels Sugar Co., San Francisco, at Woodland, Calif., $1,500,000; 146 dwellings for Gross Morton Corp., Bayside, N. Y., $410,000; 10-story apartment for 99 Lafayette Ave. Corp., Brooklyn, N. Y., $400,000; 70 residences for Toschrist Builders, Rochester, at Brighton, N. Y., $500,000; highways, by Missouri, $759,000; by Virginia, $607,000; by Ohio, $2,766,000; bridges, by New York, $491,000; by Connecticut, over Connecticut River between Middletown and Portland, $2,114,000; Minneapolis-St. Paul Sanitary District, intercepting sewers and appurtenances, Contract 112, Div. "D," St. Paul, Minn., $787,000; airport, Los Angeles, Calif., $538,000; retaining wall, Ridgeway, Pa., $447,000; 230 mi. pipe line from Zionsville, Ind., to Detroit, Mich., for Columbia Gas & Electric Co., New York City, $3,500,000.

New capital for the week includes state and municipal bond sales totaling $12,723,000 of which $6,196,000 represents purchases from R.F.C. of PWA bonds. Corporate security issues for construction purposes reached a total of $10,999,000 during the week considered for these figures.

CONTRACTS
(Thousands of Dollars)

	Weekly Average Mar. 1935	Prev. 4 Weeks	Week Mar.26 1936
Federal Government	$3,373	$2,465	$307
State and Municipal	13,845	21,588	20,919
Total public	$17,218	$24,053	$21,226
Total private	5,521	13,709	12,885
Week's total	$22,739	$37,762	$34,111
Cumulative to date: 1935...$307,311,000	1936...$603,243,000		

NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

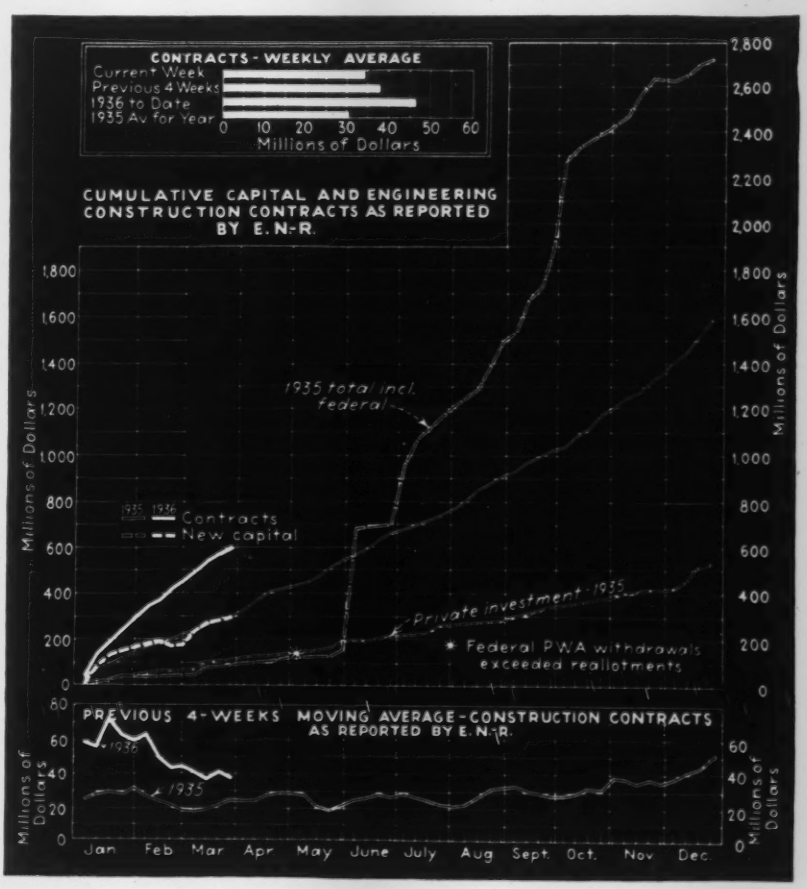
1936	Week Mar.26	Cumulative
State and municipal	$12,723*	$140,953*
PWA non-federal	—6,113*	49,644*
RFC loans	....	25,000
Corporate issues	10,999	78,545
PWA loans	....	1,270
Total Non-Federal.	$17,609	$295,412
Federal	....	4,771
Total new capital	$17,609	$300,183
Cumulative to date: 1935...$92,595,000	1936...$300,183,000	

*Includes transfer from federal to private investment financing through sale by RFC of PWA bonds.

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for federal construction, deficiency act funds. An arbitrary percentage (25%) of the WPA allotments and local contributions to WPA work is included to allow for the capital additions through the Works Progress Administration division of the new program.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Mar., 1936	201.20	96.71	Feb., 1936	176	77
Feb., 1936	201.20	96.71	Jan., 1936	248	109
Mar., 1935	194.26	93.38	Feb. 1935	76	33
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47


CONTRACTS - WEEKLY AVERAGE
Current Week
Previous 4 Weeks
1936 to Date
1935 Av for Year
0 10 20 30 40 50 60
Millions of Dollars
CUMULATIVE CAPITAL AND ENGINEERING CONSTRUCTION CONTRACTS AS REPORTED BY E.N-R.
1935 total incl. federal
1935 1936
Contracts
New capital
Private investment 1935
* Federal PWA withdrawals exceeded reallotments
Millions of Dollars
PREVIOUS 4-WEEKS MOVING AVERAGE - CONSTRUCTION CONTRACTS AS REPORTED BY E.N-R.
1936
1935
Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec

Construction Equipment and Materials

Synthetic Rubber Molding Powder

An oilproof synthetic rubber molding powder, for forming resilient and elastic objects, resembling soft vulcanized rubber, is one of the recent additions to the products of the Thiokol Corp., Yardville, N. J. This molding powder is fully vulcanized and compounded, merely requiring forming in the press for about three minutes at temperatures around 300 deg. F. The material does not undergo any chemical change or cure in being formed. All mold trim and rejects can be reground and used again. The molded products have excellent abrasion resistance and will remain flexible in temperatures as low as 45 deg. below zero F., and will stand hot oil up to 200 to 225 deg. F. Two types of molding powder are available at present: No. 1 with a hardness of 72 (Shore durometer) and No. 2 with a hardness of 55.

Bucket-type Grader Designed for Accurate Work

A new fine grader and shoulder machine has been developed by A. W. French, Chicago, Ill., formerly with A. W. French & Co.

This machine, known as the French Utility Grader, completes the work of subgrading formgrading, shoulder grading, stripping, leveling, and material loading without any major change to the machine.

The grader operates on crawler tracks, and eliminates the use of road forms when cutting subgrade construction. It cuts an accurate grade to any crown or surface desired, the grade being controlled by a leveling frame which is adjusted to a line set from the engineer's grade stakes. It can handle cuts up to 7 in. and on subgrade work cuts not only the subgrade but the formgrade at one passage of the machine. Material taken from the subgrade can be either loaded into trucks or spilled along the shoulder.

The grader is built in only one size and cuts a swatch 13 ft. wide in one passage. On wider pavements, two or more passes are made.

The grader is completely power-operated, with two gasoline engines furnishing the power. One operates the digging buckets, and the other the traction and belt conveyor. One feature of the machine is the principal of cutting with the buckets.

Photographic Reproducer Eliminates Dark Room

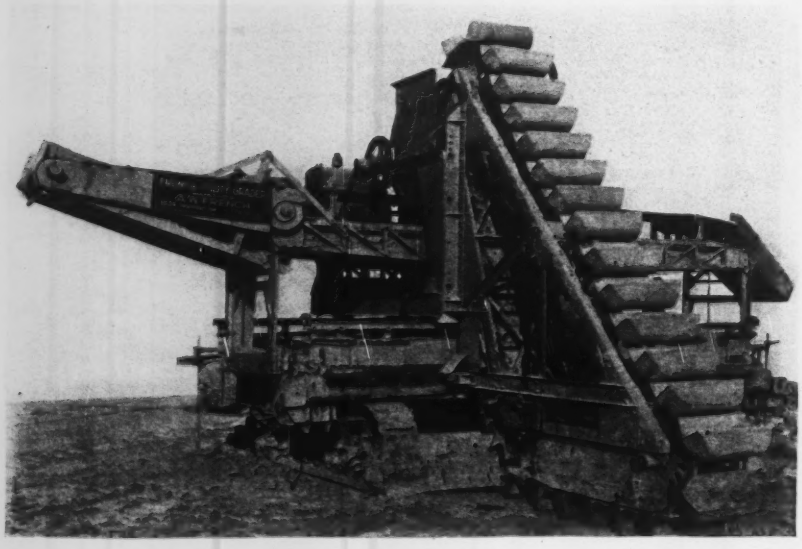
The portable Rectophot, a photo-copying machine being marketed by the Electro-Copyst, Inc., New York City, makes photographic reproductions possible without the use of a dark room. The process consists of using a photographic paper of low sensitivity which makes possible the handling and processing in a normally lighted room. Sharp copies are produced in a short time and without fog. The subject or substance of the original material does not affect the reproduction. The apparatus comes in several sizes and is equipped with a container for the sensitized paper and a time switch which automatically regulates and controls the exposure time. A small portable electric dryer is included with the equipment. The process does not require the use of lenses or prisms and copies are made by contact printing.

Two New Heavy Duty Machinery Trailers

Two additions to the line of LaCrosse machinery trailers for transporting shovels, tractors, road-rollers, and other contracting equipment have been announced by the C. R. Jahn Co., LaCrosse, Wis. One is a four-wheel trailer designed for loads up to 12 tons, and the other, with six wheels, is designed for loads up to 18 tons. In both of the models the main beams extend the full length of the trailer and are shaped without cutting top or bottom flanges at the front deck. The front deck is raised to permit a full right-angle turn.

The four-wheel trailer has a rigid mounted rear axle; while the six-wheel type has two independent oscillating type axles that are so arranged that the four wheels adjust themselves to the irregularities of the road. Both models feature the oscillating front axle, which eliminates the necessity of front springs and provides greater flexibility and ease in turning.

The brakes are of the mechanical, internal expanding type and are available for vacuum or air operation.



New Publications

TRUCK AND TRAILER SIZE AND WEIGHT RESTRICTIONS, 1936, Four Wheel Drive Auto Co., Clintonville, Wis. 3¾x7½, 53 pages.

THE CHANNEL VALVE, Ingersoll-Rand Co., New York City, 8½x11, 7 pages.

AIRCO ELECTRIC WELDING PRODUCTS, Air Reduction Sales Co., New York City, 8½x11, 31 pages. Catalog No. 101.

YOUR NEW PLANT: MULTISTORY OR SINGLE STORY—WHICH? The Austin Co., Cleveland, Ohio. 8½x11, 6 pages.

HOW TO BRONZE WELD, the Linde Air Products Co., New York City. 8½x11, 11 pages.

WOODWORKING MACHINES, Yates-American Machine Co., Beloit, Wis. 8½x11, 27 pages.

SEMI-PORTABLE PLANTS, Smith Engineering Works, Milwaukee, Wis. 7½x10½, 19 pages. Gravel plants.

RUSTPROOFING BY THE CHROMODINE PROCESS, American Chemical Paint Co., Ambler, Pa. 8½x11, 18 pages.

PNEUMATIC TOOLS FOR BRIDGE AND BUILDING WORK, Ingersoll-Rand Co., New York City. 8½x11, 15 pages.

WESTINGHOUSE: PAST, PRESENT AND FUTURE, Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa. 8½x11, 39 pages.

REX FLAT SPRAY NOZZLE, Chain Belt Co., Milwaukee, Wis. 8½x11, 4 pages.

CORROSION OF AIR CONDITIONING DUCTS, Republic Steel Corp., Cleveland, Ohio. 8½x11, 4 pages.

PERSONAL-SERVICE ELEVATOR; Otis Elevator Co., New York City. 8½x11, 10 pages.

Business Notes

BURR BROWN, formerly president of Brown & Sites Co., has resigned to accept the presidency of the Coast-to-Coast Steel and Equipment Corp., New York City. The Coast-to-Coast Steel and Equipment Corp. is a direct factory distributor of contractors machinery. This organization has been formed to give contractors a more extensive service by furnishing plant layouts, and modern methods of construction as well as supplying the equipment required.

JONES & LAUGHLIN STEEL CORP., in preparation for a program of new construction and expansion, has made the following personnel changes: S. S. MARSHALL, former general superintendent, Pittsburgh Works, becomes assistant general manager; H. D. STARK, former assistant general superintendent, will become superintendent of the Pittsburgh Works.

REPUBLIC STEEL CORP. has removed its general offices from Youngstown, Ohio, to Cleveland. This is to consolidate the general and executive offices which had been located in different cities.

THE AMERICAN WOOD PRESERVERS' ASSOCIATION has removed its New York City service bureau office to the Graybar Building, New York City.

HARNISCHFEGER CORP., Milwaukee, Wis., has announced the appointment of CHARLES R. SURFACE as sales manager of the P&H Electric Motor Sales Division.

AUTOMATIC NUT CO., has moved its general offices from New York City to Lebanon, Pa.

CENTRAL FOUNDRY CO., New York City, has removed its Pacific Coast sales office from San Francisco to Oakland, Calif.

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

★ **Calif., San Jose** — Report filed with city council by T. A. Hopkins, consult. engr., 5093 Keith Ave., Oakland, showing estimates of cost on 4 alternate plans to acquire municipal water system (1) purchase existing San Jose Water Company's system, incl. Los Gatos and Saratoga services at reproduction cost less depreciation and allowing $870,000 cost of necessary improvements, $5,600,000 (2) construct new distributing system for City of San Jose only and using 100,000 acre ft. supply from Coyote Reservoir of Santa Clara Valley Water Conservation Dist., $5,200,000 (3) construct new distributing system and using well supply, $4,750,000 (4) construct new distributing system and purchase surplus Hetch Hetchy water supply of city and county of San Francisco, $5,000,000 Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

Calif., Woodlake—Woodlake Utility Dist., election Apr. 14, to vote bonds to finance construction new water system to replace service of privately-owned water system. $32,000. L. H. Gadsby, 714 North Willis St., Visalia, engr. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

Conn., Bristol—City plans replacing 6 in. main with 12 in. main, extending from North Side to Farmington Ave. and Oakland St. $30,000 appropriation voted. Private plans. Bristol Water Dpt., 255 Main St.

Mass., Lawrence—City, W. A. Griffin, mayor, making surveys constructing filter plant, incl. new filtration bed with new intake, mixing chambers, equipped with mechanical agitators, covered coagulating basin, six 1,350,000 g.p.d. capacity rapid sand filters, designed to operate at a rate of 1,250,000 gals. per acre per day; clear well, filtered water conduit, 100,000 gal. washing tank. P. S. Nugent, supt. Water Dpt.

Mass., Rockland—Town, H. Torrey, chn. Bd. Selectmen, Town Hall, soon takes bids constructing steel water tank. $75,000 appropriation granted. Noted Feb. 28, C. D.—Mar. 5, E. N.-R.

Mass., Rockport—Town, J. H. Dennis, selectman, Town Hall, plans dug well, collecting pipes, 8 in. c.i. pipe force main, pump house and equipment, $35,000; c.i. watermains in Highland Ave., Ocean Ave., Norwood St. and Pleasant St., $8,700.

Mass., Webster—Town, J. A. Patenaude, chn. Bd. Selectmen, Town Hall, plans artesian wells, $9,000.

Mass., Weymouth—Town, M. F. Spear, chn. Bd. Selectmen, plans completion of water filtration plant $6,000 appropriated, and house service connections $10,000 appropriated. R. Whiting, town engr.

Mass., Whitman—Town, E. C. Monroe, chn. Bd. Selectmen, Town Hall, soon takes bids steel standpipe on rein.-con. base, Lincoln Rd. $17,500 appropriation granted. Noted Mar. 9, C. D.—Mar. 12, E. N.-R.

Minn., Winona — City plans furnishing, installing 20 new fire hydrants. E. E. Chadwick, city engr.

N. Y., Freeport—Village voted to construct waterworks plant, $200,000; also firehouse, $45,000. Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

N. Y., Lewiston—Town M. Switzer, supt., plans constructing water line. $60,000. **Maturity in summer.** J. Keller, 693 Orchard Parkway, Niagara Falls, engr.

N. Y., Medina—Bd. Village Trustees plans filtration plant near State Street Park Pumping Station. C. W. Grinnell, mayor. To exceed $75,000.

N. Y., Port Byron—Village, constructing waterwork system. $100,000. Project cannot proceed until additional P.W.A. allotment is made. Noted May 4, C. D.—May 9, E. N.-R.

Pa., New Holland—Municipality plans waterworks. $50,000. Wm. H. Dechant & Sons, 632 Washington St., Reading, engrs.

Pa., Pottstown—Boro Council authorized a special committee to proceed with necessary steps to purchase Pottstown Gas & Water Co., Boro Engineer, engr. Committee authorized to employ counsel, auditors and engineers. Plans improvements to properties after acquisition. Will seek approval of Public Service Comn.

R. I. Burrillville—See "Public Buildings."

R. I., Howard (Cranston)—See "Public Buildings."

R. I., Westerly—Town, A. Koy, supt. Water Dpt., Town Hall, making plans constructing 200,000 gal. steel standpipe, pumping station, two 400 g.p.m. electric pumps and c.i. pipe distributing system in Brayford Section. $150,000.

S. D., Rapid City—City plans constructing water system improvements, incl. well, laying pipe line, pump house, etc. $100,000. May hold election Apr. 1, to issue $100,000 bonds for same. H. W. Zolpher, city engr.

Utah, Ferron—Town plans constructing 3- to 6-in. supply line and distribution system. $25,454. P.W.A. loan approved. W. R. Wayman, Provo, engr.

Wash., Dayton—City soon takes bids drilling well, furnishing, installing pump, motor and new pipe. $35,000. J. C. Stockman, Baker, Ore., engr.

Wash., Everett—City plans constructing 48 in. dual supply line paralleling existing pipe line to Lake Roesiger Creek. $1,160,000; to continue line to Lake Chaplain, $1,865,000. Financing sought. G. G. Paine, City Hall, engr. Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

Ont., New Toronto—Town plans constructing 10 m.g. reservoir for water storage, also 4,000 gal. pump and 3,000 hp. motor for pumping station. $15,000.

Que., Ste. Cecile de Levard—Municipality bids in April, water line 14 mi., of which 5 mi. are to be wood and 9 mi. galvanized iron pipe. $20,000. T. Carignan, Ste. Cecile de Levard, engr.

Que., Three Rivers — Municipality bids in April or May, constructing water line 24 mi. from Las L'Eau Claire. $35,000. Z. Lambert, City Hall, engr.

Sask., Moose Jaw—Town prepares plans constructing pipe line from South Saskatchewan River at Pinhurst to Moose Jaw. H. C. Ritchie, Town Hall, engr.

Sask., Swift Current — Municipality making plans filtration plant. $48,000. P. Smith, Town Hall, engr.

Alaska, Seldovia—Town plans improving water system. $15,000. P.W.A. approval awaited.

BIDS ASKED

Mass., Andover—See "Contracts Awarded."

Mass., Belmont—See "Contracts Awarded."

Mass., Hudson—See "Contracts Awarded."

Mass., Milton—See "Contracts Awarded."

Mass., Reading—See "Contracts Awarded."

Mass., Westport—Town, E. Earle, supt. Schools, taking bids furnishing and installing 500 gal. per hr. capacity deep well pumping equipment at school building.

Minn., Rochester—Apr. 2, by C. R. Erickson, state comr. Purchases, 120 State Capitol, St. Paul, drilling deep well at State Asylum, for State, c/o Comn. of Administration & Finance, 120 State Capitol, St. Paul. G. M. Orr & Co., 408 Baker Bldg., St. Paul, engrs. Noted Apr. 24, C. D.—May 2, E. N.-R.

Minn., Stillwater—Apr. 2, by C. R. Erickson, state comr. Purchases, 120 State Capitol, St. Paul, furnishing, installing 1,791 lin.ft. 2½- to 8-in. water pipe, fittings, valves at State Prison, for Comn. Administration and Finance. G. M. Orr & Co., 408 Baker Bldg., Minneapolis, engrs. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

N. J., Montville—Mar. 31, by Montville Twp. Com., Contr. 1, water distribution system; Contr. 2, wells and pumping stations; Contr. 3, standpipe. Clyde Potts, 30 Church St., New York City, engr. Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

N. Y., Albany—Apr. 6, at office American Scenic & Historic Preservation Society, 287 Convent Ave., New York, driving well for water supply at John Boyd Thacher Park, Albany Co.

N. Y., Apalachin — Mar. 31, by Town of Owego, constructing water system. $42,000. Nussbaumer & Clarke, 518 Security Mutual Bldg., Binghamton, engrs. P.W.A. project. Noted Feb. 28, C. D.—Mar. 5, E. N.-R.

N. Y., Hempstead—Apr. 1, by Town Bd., installing waterwork equipment in Uniondale Water Dist. $310,919. P.W.A. project. C. W. MacLaughlin, town engr.; adv. E. N.-R. Mar. 26.

N. Y., Kingston—See "Contracts Awarded."

N. Y., Sodus — Apr. 6, by Town Bd., W. Grinnel, supt., constructing waterworks plant, incl. intake, filter building, coagulation basin and appurtenances for Sodus Point Water Dist., Wayne Co. $62,490. P.W.A. project. L. E. adv. E. N.-R., Mar. 26. Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

N. Y., Tonawanda—See "Contracts Awarded."

N. Y., Webster—See "Contracts Awarded."

N. C., Canton — Apr. 1, by Town, 2 m.g. filter plant with 250,000 gal. capacity, $149,900; water supply, distributing mains, sanitary sewers, incl. raw water pump station, 2 pumps, filtration plant with complete equipment, mixers, pumps, etc., 100,000 gal. concrete clear well, and 500,000 gal. concrete reservoir, plumbing, heating for filter plant, 20,700 ft. c.i. pipe gate valves, 20 fire hydrants, 9 manholes, etc., $150,909. J. L. Reeves, mayor, Harwood Beebe Co., 208 Montgomery Bldg., Spartanburg, S. C., engrs. Noted Feb. 10, C. D. — Feb. 13, E. N.-R.

Pa., Beech Creek—Apr. 7, by Beech Creek Boro, Clinton Co., at Public Schoolhouse, Clinton Boro, constructing water supply system at Liberty Twp., Centre County, Beech Creek Twp. and Beech Creek Boro, Clinton Co., consisting of an earthen dam with masonry core wall and masonry spillway, pipe line and distribution system, consisting of sand spun cast iron pipe, together with chlorinating plant. G. M. Busch, Jr., 112 West 4th St., Williamsport, engr.; adv. E. N.-R. Mar. 26. Noted Feb. 27, C. D.—Feb. 13, E. N.-R.

Wash., Oakville—Apr. 13, by Town Council, drilling well from 75 to 90 ft. with alternates on 8 and 10 in. casing.

W. Va., Clarksburg—Apr. 10, at office Clarksburg Water Bd., S. G. Highland, secy. and genl. mgr., laying 1,600 lin.ft. 24 in. B. & S. water pipe.

Wis., Park Falls—Apr. 9, by City, W. E. Windus, clk., laying 1.62 mi. 8 in. watermains. City to furnish pipe.

CONTRACTS AWARDED

Ala., Montevallo—Alabama College, 300,000 g.p.d. filter plant, incl. building, clear well, sedimentation basin, filter, piping, chlorinator, etc., to Rust Eng. Co., Martin Bldg., Birmingham, about $17,000. Est. $20,000. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Calif., Coalinga — E. McCroskey, city clk., furnishing complete water well pumping unit, 900 g.p.m. against direct head of 55 lb. pressure in 10 in. main, to Submersible Pump Co., Fresno, $3,800. Awarded Mar. 17. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

Calif., San Francisco — Dpt. P. Wks., City Hall, installing Bay approach extension to auxiliary water supply system for fire protection, located chiefly in Perry St. between 5th and 1st Sts., to C. L. Harne, 74 New Montgomery St., $29,962. Est. $32,000. Bids Feb. 19, awarded Mar. 16. Noted Feb. 26, C. D.

Ind., Dublin—Town Bd., A. E. Simpson, clk., Div. B, deep well, pump, electric motor, engine accessories, electrical equipment, and Div. C, meters, to E. A. Marinan, Richmond. Est. $47,500. **P.W.A.** Bids Mar. 20. Noted Oct. 8, C. D.

La., New Orleans—Sewerage & Water Bd., furnishing labor and material on percentage basis for 1936 for construction of waterworks, sewerage and drainage structures, to J. M. McGowan, 1209 Joseph St., New Orleans, 3.45 percent. Bids Mar. 10. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

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Projects $500,000 and over symbol ★
Reports noted back to former issues are designated as follows:
C. D. Construction Daily
E. N.-R. Engineering News-Record
Federal Government projects symbol †

◆

†*Federal Government.*

For official proposal advertising see Searchlight Section

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"Champion" Bucket

PAYLOADS THAT *ARE* PAYLOADS. Shorter cable overhaul for greater speed. Exclusive power-arm combination of lever and block-and-tackle for greater digging power.

Write for Bulletin

A Size for Every Need

THE WELLMAN ENGINEERING CO.
7000 Central Avenue, Cleveland, Ohio

POWER-ARM... MULTIPLE-ROPE

WILLIAMS BUCKETS

POWER-WHEEL AND DRAGLINE

WATER PROOFING with— Sika

Railroad Tunnel Under East River, N. Y. C.

Use SIKA to stop leakage through structurally sound masonry—as, foundations, pits, dams, manholes, filter beds, sewage tunnels, etc. Sika mixed with portland cement is easily applied by hand and will successfully seal off infiltration from inside even under pressure.

Write us about your problems.

SIKA, Inc.
1943 Grand Central Terminal, New York City

Waterworks (Continued)

Me., Falmouth—John McDonald Constr. Co., general contractors, 215 California St., Newton, Mass., furnishing 390 tons c.i. pipe, in connection with waterworks construction, to Central Fdry. Co., 420 Lexington Ave., New York, for Portland Water District, Casco St., Portland. Noted Jan. 16, C. D.—Jan. 23, E. N.-R., under "Contracts Awarded."

Mass., Andover—Town, F. H. Hardy, chn. Bd. Selectmen Town Hall, water supply maintenance $25,000, watermain construction $23,406, sewer maintenance $6,900, day labor. Grand total $55,306. Funds appropriated. C. Gilliard, chn. Bd. P. Wks., in direct charge.

Mass., Belmont—Town, J. W. Flett, chn. Bd. Selectmen, Town Hall, water maintenance and construction during 1936, day labor. $62,671 appropriated. E. J. Looney, supt. Water Dpt.

Mass., Cotuit—Cotuit Fire Dist., Bd. Water Comrs., C. D. Crawford, chn., Freedom Hall, gravel well work only, to Crandall, Inc., 261 Franklin St., Boston, $7,010. **P.W.A.** Bids Mar. 4, awarded Mar. 12. Noted Mar. 10, C. D.—Mar. 7, E. N.-R.

Mass., Hudson — Town, E. Morgan, supt. Streets, Town Hall, watermain extensions and maintenance, day labor. $33,000.

Mass., Milton—Town, J. Babcock, chn. Bd. Selectmen, watermain construction and maintenance, day labor during 1936. $168,370 appropriated.

Mass., Northboro—Town, Town Hall, furnishing filter equipment, incl. low lift pump, altitude valve, 2 flow controllers, 2 flow rate gages, 2 loss of head gages, 2 chemical dry feeders, electric driven centrifugal pump with starting equipment, to Robert Filter Co., 614 Columbia Ave., Darby, Pa., $2,860. **P.W.A.** Bids Mar. 5, awarded Mar. 14. Noted Mar. 10, C. D.—Feb. 27, E. N.-R.

Mass., Reading—Town, H. W. Putnam, chn. Bd. P. Wks., Town Hall, water supply, $54,800 appropriated; and sewer line construction and maintenance, $11,200 appropriated, day labor.

Minn., Red Wing—State, c/o Comn. Administration & Finance, 120 State Capitol Bldg., St. Paul, furnishing, installing one 500,000 gal. deep well pump, and one 500 gal. horizontal centrifugal pump, with appurtenances, at State Training School for Boys, to Fairbanks Morse & Co., 220 East 5th St., St. Paul, $3,767. Bids Feb. 18. Noted Feb. 6, C. D.—Feb. 13, E. N.-R.

Minn., Roseau—Village, drilling 12 in. well and furnishing castings, screens and other materials, to Knute Grahn, Roseau, $2,500. Bids Mar. 2. Noted Feb. 26, C. D.

Neb., Alvo—City, hydrants, valves, boxes, 70 g.p.m. deep well pump and copper service pipe, Sects. 5, 7 and 9, to Interstate Mchy. & Supply Co., 1006 Douglas St., Omaha, $2,301. **P.W.A.** Bids Feb. 17. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

Neb., Elba — City, water meters, Sect. 8a, to American Mchy. & Supply Co., 1113 Howard St., Omaha, $200***fire hose, Sect. 12, to Eureka Fire Hose Co., 9th and Douglas Sts., Omaha, $460. **P.W.A.** Bids Dec. 13. Noted Dec. 6, C. D.

Neb., Hickman—City, tank and tower for waterworks, to Omaha Steel Wks., 609 South 48th St., Omaha, $5,800. **P.W.A.** Noted Dec. 9, C. D.—Dec. 12, E. N.-R.

Neb., Howard City—City, deep well turbine pump for waterworks, to Interstate Mchy. & Supply Co., 1006 Douglas St., Omaha, $599; 8-in. tubular well, 60 ft. deep, to Olson & Anderson, Oakland, $570. **P.W.A.** Bids Dec. 13. Noted Jan. 3, C. D.

Neb., Omaha — Metropolitan Utilities Dist., furnishing, installing 30 m.g. electrically driven centrifugal pumping unit, to Fairbanks Morse & Co., 9th and Harney Sts., $14,049. **P.W.A.** Bids Mar. 6. Noted Feb. 27, C. D.—Jan. 16, E. N.-R.

N. J., East Orange—Town, additions to East Orange water reserve, consisting of 28,800 ft. cement and stone rubble walls, excavating, cleaning 20,000 ft. drainage, 12 mi. ditches, 11,000 sq.yd. macadam roads, constructing fire guards and pruning 10,000 trees, labor will be W.P.A. men employed through State of New Jersey Employment Service, 1060 Broad St. Materials will be purchased by W.P.A., $188,566. **W.P.A.** W. D. Willegarod, town, engr.

N. Y., Albany—Bd. Contr. & Supply, City Hall, 600 tons steel mesh reinforcement for addition to Loudenville Reservoir, Loudenville, to Concrete Steel Co., 207 James St., Syracuse. Noted Jan. 30, C. D.—Feb. 6, E. N.-R.

N. Y., Evans—Evans Town Bd., general contract waterworks, to LaMacchia & Guadagnino, R.F.D. 2, Hamburg, $40,403. **P.W.A.** Bids Mar. 4. Noted Mar. 10, C. D.—Feb. 27, E. N.-R.

N. Y., Kingston—City, City Hall, constructing watermains with fire hydrants, Savoy St., Harding and Wilson Aves., relief labor. $30,000. **W.P.A.** J. W. Carroll, Old Post Office Bldg., Albany, procurement Officer, W.P.A., will purchase materials.

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N. Y., Mount Vernon—Village, 100 tons ... pipe for waterworks project, to Donaldson I... Co., Emaus, Pa. Noted Nov. 1, C. D.—Nov. ... E. N.-R., under "Contracts Awarded."

N. Y., Tonawanda—Village, cleaning ... painting pumping and filter plants, relief la... $4,000. H. F. Burd, 1014 City Hall, U... procurement officer W.P.A., will purchase ... terials.

N. Y., Webster—Village, drilling well ... waterworks, to Layne New York Co., 92 L... erty St., New York. When well has been dri... successfully, bids will be taken for 250,0... gal. standpipe, 25,000 ft. c.i. piping, pum... filter plant, etc. Total $200,000. P.W.A. pr... ect. Meloy Smith, 16 State St., Rochest... engr. Noted Aug. 19, C. D.—Aug. 22, E. N.-R.

O., Cincinnati—City, waterworks pump... station, Contr. A, to Dravo Doyle Co., 30... Pennsylvania Ave., Pittsburgh, Pa., $101,00... **P.W.A.** Noted Dec. 12, C. D.

O., Union City—City, tanks and towers ... Chicago Bridge Co., 37 West Van Buren St... $9,025***pumphouse, pipeline and tank foun... pump, to Sweeney Summers, Piqua***wells and pumping station, to Lane Ohio Co., Columbia... $3,400. Est. $21,000.

S. C., Wagener—Town, installing waterworks system, Contr. 1, well and pump, to Virginia Mchy. & Well Co., 1319 East Main St., Richmond, Va.***Contr. 2, pipe line, to Chalmers Constr. Co., Florence***Contr. 3, tank and tower, to Taylor Iron Wks., 1014 Bway., Macon, Ga. **P.W.A.** Ryan Eng. Co., 41 Arcade Bldg., Columbia, engrs.

Va., Marshall—City, waterworks, to Scott Horner & Mason, Inc., Lynchburg, $23,350. Bids Nov. 12. Noted Nov. 7, C. D.

Wash., Chehalis—City, constructing gravity supply line, 3,800 ft. 16 in. c.i. and 52,000 ft. 16 in. creosoted wood pipe, to F. J. Paka, Chehalis, $121,314. Est. $125,000. B. Bantz, Court House, engr. Noted Dec. 5, C. D.—Dec. 12, E. N.-R.

Wash., Seattle—King Co. Water Dist. 42, c/o Parker & Hill, engrs., Smith Tower, furnishing 100,000 gal. steel storage tank, 453 valves, 229 hydrants and 49 mi. of O. D. wrapped steel pipe, consisting of 3,793 ft. 1½ in., 200 ft. 2 in., 74.00 ft. 3 in., 139,000 ft. 4 in., 33,400 ft. 6 in., 3,120 ft. 8 in., 1,640 ft. 10 in. and 532 ft. 12 in. pipe, to Washington Corrugated Culvert Co., 4327 Roosevelt Way, $97,293; pipe laid by **W.P.A.** labor. $150,000.

Wis., Milwaukee—Dpt. P. Wks., constructing concrete conduits and surge shafts for water purification plant, to Stein Constr. Co., 1860 North Prospect Ave., $126,640. **P.W.A.** Bids Feb. 4. Noted Feb. 11, C. D.—Jan. 23, E. N.-R.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Calif., Decoto—Decoto Sanitary Dist., election Apr. 7, to vote bonds to finance constructing sanitary sewerage system. Est. 1st unit is $50,000. Total est. $114,000. Noted Dec. 24, C. D.—Jan. 2, E. N.-R.

Conn., Hartford—Metropolitan Dist., Bureau of P. Wks., making plans North Branch Interceptor, 4,355 ft. 54 in. sewer, incl. first portion 2,540 ft. in Park St. and Capitol Ave. to Jefferson St.; second portion, 1,815 ft. Capitol Ave. to Farmington Ave. via Hawthorne St. and private property. To exceed $25,000. R. N. Clark, Metropolitan District, mgr. Sewer Div.

Mich., Muskegon—City soon takes bids on sewage treatment plant lift station, $45,000. Townsend & Quinlan, 205 West Wacker Dr., Chicago, Ill., engrs.

Mich., Whitehall—City soon takes bids sewage treatment plant, W.P.A. labor and materials, $30,000. Townsend & Quinlan, 205 West Wacker Dr., Chicago, Ill., engrs.

Mo., Clayton (St. Louis P. O.)—City soon takes bids constructing sanitary and storm sewers in various streets in Davis Estate Properties. $181,382. $81,622 P.W.A. grant approved. Pitzman's Co. of Surveyors & Engineers, 615 Chestnut St., St. Louis, engrs.

Mo., St. Louis—City soon takes bids sanitary sewers in various streets. $139,050. P.W.A. project. L. A. Pettus, city engr.

Mo., St. Louis—Bd. P. Serv., City Hall, plans constructing garbage grinding plant with necessary equipment. $40,000† appropriated. Site not selected. F. G. McDevitt, dir. Streets & Sewers.

Mont., Great Falls—City, W. H. Harrison, clk., furnishing materials and installing sanitary sewer in 13 blocks Central Ave. between 19th and 32nd Sts. $34,800. A. J. Cook, city engr.

N. H., Manchester — City, D. Caron, mayor, City Hall, preliminary estimates being received for incinerator. $150,000. P.W.A. grant $67,500. F. B. Kennedy, city engr.

†*Federal Government.*

Sewerage, etc. (Continued)

N. J., Flemington—Mayor and Council plan sewage disposal plant. $50,000. State Board Health ordered town to provide new disposal facil. L. P. Booz, 263 Madison Ave., Perth Amboy, engr. Noted Oct. 11, C. D.—Oct. 17, E. N.-R.

N. Y., Baldwinsville—Village plans 12 mi. vitr. tile sewers on both sides of Seneca River. $300,000. Engineer not appointed. Noted Nov. 27, 1933. C.D.—Nov. 30, 1933, E.N.-R.

N. Y., Mohawk—Village will not construct sewage disposal plant. $26,926. Project temporarily abandoned due to lack of P.W.A. funds.

★**N. Y., Utica**—City sewage disposal plant. Project held up due to lack of P.W.A. funds. $1,135,704. Grant of $510,617 approved and work may proceed in 1936 if additional funds are appropriated. J. B. Shaw, city engr. Noted July 18, C. D.—July 25, E. N.-R.

O., Wapakoneta — City plans constructing sewage treatment works. $80,000. P.W.A. project. O. L. Barnebey, 215 East Lane Ave., Columbus, consult. engr.

Okla., Oklahoma City—City made preliminary plans constructing 1,400 ft. 48 in. concrete storm sewer in Rhode Island St. from 22nd to 26th Sts. $26,200. L. M. Bush, city engr.

Okla., Tahlequah — City plans sewage disposal plant. $26,612. W.P.A. project. W. L. Benham, 431 Main St., Oklahoma City, engr.

Pa., Manor—Boro. preliminary plans completed new sewage disposal system. $25,000. J. N. Chester Engineers, Clark Bldg., Pittsburgh, engrs.

Pa., Scranton—City plans sanitary sewerage system in 10th ward, incl. expenditure $21,000 for pumping station. $127,000. **Maturity soon.** C. F. Schroeder, city engr.

R. I., Burrillville—See "Public Buildings."

R. I., Howard (Cranston) — See "Public Buildings."

R. I., Providence—City, C. A. Maguire, comr. P. Wks., City Hall, plans sewers in various streets. $200,000. Bill in legislature for bond issue. S. F. Nolan, city engr.

Utah, Payson—Town soon holds election to vote bonds for constructing sewerage system. $300,000. Engineer not appointed.

Wash., Bellingham—City seeking means of financing construction sanitary sewer, to complete preliminary work started by C.W.A. 1934, when some trench work was done and 1,100 ft. 30 in. pipe were laid. $100,000. J. Adams, City Hall, engr.

N. S., Halifax—City to call tenders in April enlarging incinerator, $25,000.

Ont., Brampton—Municipality making plans extending sewerage disposal plant and other works. $30,000. D. T. Black, Town Hall, engr.

Ont., Hespeler—Town plans sewage disposal plant, $30,000; 37,974 ft. vitr. clay sewerage system, $76,000. W. A. Spellman, 111 Pandora St., Kitchener, engr. Noted July 24, C. D.—Aug. 11, E. N.-R.

BIDS ASKED

★**Ark., Little Rock**—Mar. 31, by Secretary Sewer Comn., constructing 24,028 lin.ft. section of trunk line sewer and rein.-con. manholes. Sect. B, $350,000; Sect. C, involving 21,667 lin.ft. trunk line sewer and sewer manholes, $110,000; Sect. D, cleaning out existing sewers, removing and replacing pavements necessary to uncover sewer line repairs to manholes and pipe joints, $125,000. P.W.A. project. H. R. Carter, 2103 Gaines St., engr. Noted Feb. 15, 1935, C. D.—Feb. 21, 1935, E. N.-R.

Conn., Manchester—See "Contracts Awarded."

Ill., Waukegan—Apr. 6, by City, Bd. Local Impvts., 20 South Ithaca St., constructing sewers. $44,000. P.W.A. project. H. B. Beck, city engr.

Ind., Evansville—Apr. 2, by Bd. P. Wks. & Safety, cons.ructing Divs. D, J and K, for Evansville Sewerage Project. P.W.A. project. L. A. Guepel, dir.

Kan., Greensburg—Apr. 7, at office of A. C. Reed, city clk., complete sewage disposal works, Imhoff tank and trickling filter type. Bids Feb. 28 rejected. Paulette & Wilson, 311 Farmers Union Bldg., Salina, engrs. Noted Feb. 18, C. D.—Feb. 20, E. N.-R.

Mass., Belmont—See "Contracts Awarded."

Mass., Wellesley—See "Contracts Awarded."

Mich., Whitehall—See "Proposed Work."

Minn., St. Paul—Apr. 6, by Minneapolis-St. Paul Sanitary Dist., 1923 University Ave., St. Paul, constructing intercepting sewer, shaft and appurtenances for Div. F, Job 600, between point about 550 ft. north of north line of Como River Blvd., and point about 85 ft. west of Somerville Ave., and 70 ft. north of center line of Mississippi River Blvd., P.W.A. project.

Minn., Willmar—Apr. 9, by L. G. Foley, chn. State Bd. Control, State Office Bldg., St. Paul, furnishing, placing 4,200 lin. ft. 8 in. c.i. pipe sewer main, pump house, sewer pumps, sewage treatment plant at State Asylum. $30,000. G. M. Orr & Co., 408 Baker Bldg., Minneapolis, engrs.

N. H., Durham—See "Contracts Awarded."

N. Y., Albany—See "Contracts Awarded."

N. Y., Herkimer—Apr. 6, by Village, Municipal Bldg., constructing sewage disposal plant. P.W.A. project. Bids Dec. 10 rejected. H. W. Taylor, 11 Park Pl., New York, consult. engr.; adv. E. N.-R., Mar. 26. (**Correction**—Date of bids.) Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

N. Y., Mamaroneck—See "Contracts Awarded."

N. Y., North Tonowanda — See "Contracts Awarded."

N. Y., Orangeburg—Apr. 15, by Dpt. Mental Hygiene, State Office Bldg., Albany, constructing sewage disposal plant, Contr. 2. $151,796.

N. Y., Oyster Bay—Apr. 7, by Town Bd., E. McQueen, clk., Town Hall, Audrey Ave., constructing refuse incineration plant, road, yard, watermain. $103,179. P.W.A. project; adv. E. N.-R., Mar. 26. Noted Nov. 12, C. D.—Nov. 14, E. N.-R.

N. Y., Rome—See "Contracts Awarded."

N. Y., Utica—See "Contracts Awarded."

N. Y., Watertown—See "Contracts Awarded."

Wis., Racine—Apr. 2, by City, H. A. Nelson, comr., constructing North Side Interceptor Sewer.

Wis., Sauk City—See "Contracts Awarded."

Wis., Sheboygan—Apr. 10, by City, constructing Intercepting Sewer, Contract "E." P.W.A. project. J. Donohue Eng. Co., Sheboygan, engrs.

Wis., Wauwatosa—Apr. 3, by City, constructing storm sewer and appurtenances in Martha Washington Dr. from Milwaukee Ave. to Morton Dr. Alternate A, 1 concrete entrance apron, 68 ft. rein.-con. culvert invert 12 ft. wide, 1 transition invert in culvert, 140 ft. rein.-con. culvert invert 9 ft. wide, 1 rein.-con. drop chamber Type A, 581 ft. 72 in. rein.-con. sewer 212 ft. 72 in. rein.-con. leveled pipe sewer for 200 ft. radius, 1 rein.-con. transition chamber, 327 ft. rein.-con. box sewer, 1 rein.-con. stone outlet chamber; Alternate B, 1 concrete entrance apron, 68 ft. rein.-con. culvert invert 12 ft. wide, 140 ft. rein.-con. culvert invert 9 ft. wide, 1 transition invert in culvert, 1 rein.-con. drop chamber Type B, 1,134 ft. rein.-con. box sewer, 1 rein.-con. and stone outlet structure. P.W.A. project. E. A. Johnson, acting city engr.

CONTRACTS AWARDED

Conn., Manchester — Town, constructing 6,250 ft. sanitary sewers in Walker, Goodwin and Franklin Sts. Owner builds. **W.P.A.** $24,863. H. L. Griswold, Town Hall, engr.

Mass., Andover—See "Waterworks."

Mass., Belmont—Town; J. W. Flett, chn. Bd. Selectmen, Town Hall, concrete and vitr. clay sanitary sewer extensions $20,000; concrete storm water sewer extensions $20,000; day labor. W. R. Thompson, Town Hall, supt. of Sewers.

Mass., Reading—See "Waterworks."

Mass., Wellesley—Town, W. A. Bennett, supt. Hys., Town Hall, sewer construction and maintenance, day labor during 1936. $30,000 appropriated.

★**Minn., St. Paul**—Minneapolis-St. Paul Sanitary Dist., M. Rosen, secy., 1923 University Ave., constructing intercepting sewers and appurtenances, Contr. 112, Div. D, near Griggs St.-St. Anthony Ave., near Victoria St.-St. Anthony Ave., to A. Johnson Constr. Co., 1411 Goshay Tower, Minneapolis, $786,782. Bids Mar. 12. Noted Mar. 2, C. D.—Mar. 5, E. N.-R.

N. H., Durham—University of New Hampshire, E. M. Lewis, pres., constructing low level sewerage system, incl. pumping station equipment and piping, day labor under **W.P.A.**, $50,000. Owner purchases materials from engineer's specifications. Weston & Sampson, 14 Beacon St., Boston, Mass., engrs. Noted Dec. 2, C. D.—Dec. 5, E. N.-R., under "Contracts Awarded."

N. J., Irvington—Town, constructing 2,700 ft. 15 in. concrete sewer in Madison Ave., starting at Orange St., running east to Linden Ave., then south on Linden to Bell Sts., relief labor, under I. J. Casey, engr., Town Hall. Materials will be purchased by **W.P.A.** $24,764.

N. Y., Albany—City, constructing 4,350 lin. ft. 12 in. sanitary sewer in Russell Rd., 13th Ward, incl. manholes and catch basins, relief labor. $40,000. **W.P.A.** J. W. Carroll, Old Post Office Bldg., Albany, procurement officer W.P.A., will purchase materials.

N. Y., Albany—City, constructing 1,070 lin.ft. sanitary sewer in Arch and Warren Sts., to G. Hockensmith, 401 Roup St., Pittsburgh, Pa., $135,289. Est. $165,000. **P.W.A.** Bids Mar. 2. Noted Mar. 16, C. D.—Feb. 27, E. N.-R.

N. Y., Cairo—See "Streets and Roads."

†*Federal Government.*

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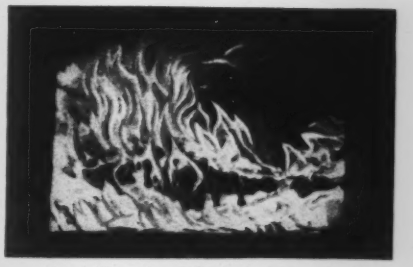

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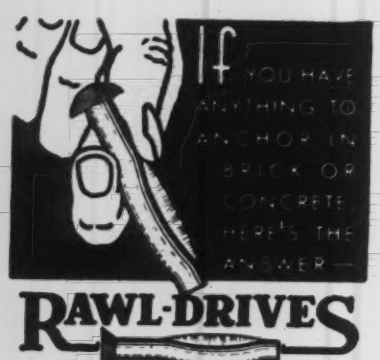

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Sewerage, etc. (Continued)

N. Y., Mamaroneck—Village, installing 8 in. sewer in Murdock Rd., relief labor. $30,000. **W.P.A.** D. Jordon, High School, Main St., White Plains, procurement officer W.P.A., will purchase materials.

N. Y., New York—Di Menna & Cleverock, Inc., general contractors, 420 Lexington Ave., 250 tons reinforcing steel for sewers for Dpt. Sanitation, Municipal Bldg., to Jones & Laughlin Steel Co., 3rd Ave. and Ross St. Noted Feb. 28. C.D.—Mar. 5, E. N.-R.

N. Y., North Tonowanda—City, constructing storm sewers with necessary manholes, drop inlets, connections in Walck Rd., Goundry, Christiania and Oliver Sts., relief labor. $35,000. **W.P.A.** E. Noonan, Bailey Bldg., Lockport, W.P.A. procurement officer, will purchase materials.

N. Y., Rome—City, constructing 44 ft. box type storm sewer in bed of abandoned canal from existing storm sewer, 658 lin.ft. to New York State Barge Canal, relief labor, $25,000. **W.P.A.** D. Mahoney, Hotel St., Utica, procurement officer W.P.A., will purchase materials.

N. Y., Utica—City, laying sewers in Armory Dr., from Madison Ave. to Parkway, by relief labor. $37,000-$40,000. J. B. Shaw, city engr. D. Mahoney, Hotel St., procurement officer W.P.A., will purchase materials.

N. Y., Utica—City, constructing sewers in Buchanan and Utica Rds., relief labor. $25,000. **W.P.A.** J. Shaw, city engr. D. Mahoney, Hotel St., procurement officer W.P.A., will purchase materials.

N. Y., Watertown—City, constructing tile sewer in Massena St., incl. manholes, house connections, relief labor. $23,000. **W.P.A.** D. Mahoney, Hotel St., Utica, procurement officer W.P.A., will purchase materials.

O., Greenville—City, completing sewage disposal plant, to L. C. Love, Sidney. $134,472. Est. $153,242. **P.W.A.** H. P. Jones Co., 2nd National Bank Bldg., Toledo, engrs. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

Ore., Lakeview—City, sewage treatment plant, to Herber & Sheldon, Pendleton, $37,927. Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

Wis., DeForest—Village, sewage pumps and sludge pumps, to Yeomans Bros. Co., 1433 North Dayton St., Chicago, Ill., $457 and $523 respectively***sludge pumps, to Chain Belt Co., 160 West Bruce St., Milwaukee, $1,703*** distributor, to Northern Conveyor Co., Janesville, $490***structural steel, to T. Kuppfer Fdry. & Iron Co., Madison, $505***miscellaneous material, to DeForest Lumber Co., DeForest, $2,074. Grand total $5,752. Bids Feb. 3. Noted Feb. 24, C. D.

Wis., Sank City—Village, sewage treatment plant, W.P.A. labor. Consoer, Townsend, Older, Quinlan, 205 West Wacker Dr., Chicago, Ill., and 757 North Bway., Milwaukee, Wis., engrs.

Wis., Sheboygan—City, digestors for sewage treatment plant, to Dorr Co., 221 North LaSalle St., Chicago, Ill., $23,000***grit collecting equipment, also screen and incinerator, to Chain Belt Co., 1600 West Bruce St., Milwaukee, $5,200 and $2,685 respectively***venturi meter, to Bailey Meter Co., 523 East Day St., Milwaukee, $3,840***pressure gas holder, to Chicago Bridge & Iron Co., 37 West Van Buren St., Chicago, Ill., $20,760***chlorinators, to Wallace & Tiernan, Madison, $4,147***sewage pumps and motors, to Yeomans Bros. Co., 1433 North Dayton St., Chicago, $14,306***sewer, to Northern States Impvt. Co., 312 Endicott Bldg., St. Paul, Minn., $147,357. Grand total $221,295. **P.W.A.** Bids Feb. 21. Noted Feb. 28, C. D.—Feb. 13, E. N.-R.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

Conn., New Britain—City, P. Wks. Dpt., plans rebuilding Corbin Ave. Railroad Bridge, $26,000. New York, New Haven & Hartford R.R. to share cost. G. Molleur, City Hall, New Britain, engr.

Iowa—State Hy. Comn., Ames, soon takes bids constructing one 150x24 ft. high truss bridge with seven 37x24 ft. I-beam approach spans and paving approach fills, incl. 387 cu.yd. Class 1 and 188 cu.yd. Class 2 excav. on Primary Rd. 2, west of Rose Hill, Mahaska Co. F. R. White, ch. engr.

Iowa—State Hy. Comn., Ames, soon takes bids constructing one 24x24 ft. concrete rigid frame grade separation bridge, incl. 185 cu. yd. Class 1 excav.; two 17x24 ft. and one 18x24 ft. continuous slab bridge, 150 cu.yd. Class 1 and 225 cu.yd. Class 2 excav.; one 30 ft. rein.-con. arch bridge, 85 cu.yd. Class 1 and 260 cu.yd. Class 2 excav.; raising three 50x24 ft. I-beam span bridge, all on relocation U. S. Rd. 6, through Davenport, Scott Co.; constructing one 190x24 ft. continuous I-beam bridge on secondary road in Dunkerton, Black Hawk Co., 95 cu.yd. Class 1 and 165 cu.yd. Class 2 excav.; one 40x24 ft. skew I-beam bridge on relocation, Primary Rd. 175 [illegible] U. S. Rd. 65 west, Hardin Co., 190 cu.yd. Class 1 and 205 cu.yd. Class 2 excav.; 2[illegible]24 ft. multiple span overhead crossing on Pri[illegible] Rd. 181 on C. R. I. & P. Ry. crossing [illegible] of Dallas and Melcher, Marion Co., 985 cu.yd. excav.; one 50x24 ft. rein.-con. arch bridge on Primary Rd. 175, west of Ellsworth, Hamilton and Hardin Counties, 600 cu.yd. Class 1 [illegible] cu.yd. Class 2 and 110 cu.yd. channel excav.; 1 corrugated metal pipe culvert extension, 5 rein.-con. pipe and 4 rein.-con. box culverts on secondary road south of Fort Des M[illegible], Polk Co., 280 cu.yd. Class 1 excav.; 24 rein.-con. pipe and 4 rein.-con. box culverts on Primary Rd. 44 along county line north and southwest of Bend, Kossuth and Palo Alto Counties, 410 cu.yd. Class 1 excav.; 1 [illegible] rugated metal pipe culvert extension, 3 rein.-con. pipe and 6 rein.-con. box culverts on Primary Rd. 93 south of Sumner West, Bremer Co., 100 cu.yd. excav. F. R. White, ch. engr.

Ia., Shenandoah—See "Unclassified," under Missouri."

★ **Mass., Boston**—W. F. Callahan, comr. Dpt. P. Wks., 100 Nashua St., asking for $1,000,000 to repair bridges and hys. account of damage caused by recent floods throughout the Commonwealth. The commissioner requests that the above amount be included in the supplementary budget of the Commonwealth for 1936. G. H. Delano, 100 Nashua St., Boston, engr.

★ **Missouri**—State Hy. Comn., Jefferson City, plans constructing two 50 ft. I-beam spans and one 120 ft. steel truss span bridge over Sandy Creek road from Hannibal to St. Louis, Route 79TR, Lincoln Co.; five 41 ft. I-beam spans over Hubble Creek, on Route SE, Cape Girardeau Co.; two 49 ft. I-beam and two 120 ft. steel truss spans over St. Francois River, Route 61 west, Route ST, Madison Co.; two 40 ft. I-beam spans and one 100 ft. plate girder bridge over Ramsey Creek, from Hannibal to St. Louis, Route 79TR; three 130 ft. steel truss spans over Salt R.O.F. road from Louisiana to Frankford, both Pike Co.; four 49 ft. spans over Bear Creek road from Route 66 north, Laclede Co.; four 35 ft. and one 49 ft. I-beam spans over Barron Creek from Eastwood North and South, Carter Co.; one 45 ft. I-beam span over Whitewater River on road from Sedgerwickville north; two 31 ft. and three 49 ft. I-beam spans over Indian Creek on road from Cape Girardeau northeast, both Cape Girardeau Co.; three 80 ft. deck plate girder spans over Grand R.D. Channel, on road from Archie to Creighton, Cass Co.; seven 45 ft. I-beam spans and one 100 ft. deck plate girder span from Excelsior Springs South, Clay Co.; four 40 ft. concrete deck girder spans over Bourbruse Creek road from Vienna to St. James, Phelps Co.; nine 49 ft. I-beam spans over Little North Fork White River, Ozark Co.; two 59 ft. I-beam spans and one 80 ft. steel truss span over Cane Creek road from Route 42 to Route SD, Butler Co.; six 30 ft. and one 49 ft. I-beam spans over Salt Pond Creek on Route 20 to Route 65, Saline Co.; five 29 ft. and one 49 ft. I-beam spans over Little Auxvasse Creek road from Cedar City to Maoken, Callaway Co.; three 25 ft. and three 37 ft. bridges over Fourche A-Du-Clas Creek on Route 25 west, St. Genevieve Co.; six 40 ft. and one 100 ft. steel truss spans over Little Platte River, Route 169; two 50 ft. and one 70 ft. continuous I-beam spans over Little Platte River, Route 169, both Clay Co.; three 30 ft. I-beam spans over Bear Creek road from Kansas City to Atchison, Route 45, TR, Platte Co.; three 25 ft. I-beam spans over Owens Creek, from Kansas City to St. Joseph Rd., Clay Co.; one 110 ft. steel truss span over Lost Creek from Hannibal to St. Louis, Lincoln Co.; one 110 ft. steel truss span over McLeans branch on road from Hannibal to St. Louis, Lincoln Co. $529,000. T. H. Cutler, state hy. engr.

New York—Dpt. P. Wks., Albany, plans replacing old structure between Rip Van Winkle Bridge and Catskill. To exceed $23,000. J. F. Bixby, engr., Pleasant Valley Rd., Poughkeepsie, designing number of steel, concrete bridges. Bids later in 1936.

N. Y., Bath—Bd. Supervs. Steuben Co., plans replacing 2 span bridge over Conhocton River, Cameron St. W. Boileau, village engr.

N. Y., Fleetwood—Bd. Supervs. Westchester Co., County Bldg., White Plains, plans viaduct for Cross County Parkway, in Fleetwood, between Yonkers and Mount Vernon, to carry Cross County Parkway over New York Central R.R. tracks. To exceed $100,000.

N. Y., Gasport—New York Central R.R., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, making plans constructing underpass for grade crossing elimination at Graham Crossing.

N. Y., Homer—Dpt. P. Wks., State Office Bldg., Albany, plans constructing 600 ft. steel concrete highway bridge to replace old bridge on Hy. 380. To exceed $23,000. G. W. Pinck, Weighlock Bldg., Syracuse, engr.

N. Y., Jamestown—Bd. Supervs. Chautauqua Co., Mayville, plans replacing bridge with steel concrete bridge. $259,000. P.W.A. funds allotted.

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†*Federal Government*

Bridges, etc. (Cotninued)

N. Y., Norwich—Bd. Supervs. Chenango Co. making plans constructing 2 bridges in village of Greene, $69,000; 2 steel, concrete bridges, incl. grading approaches, one on Smithfield Flats-McDonough Hy., $34,000; and other on Long Pond-Smithville Flats Hy., $20,000. **Maturity in spring.**

N. Y., Poughkeepsie—Bd. Supervs. Dutchess Co. plans replacing bridge with steel, concrete bridge. $117,000. P.W.A. funds allotted.

N. Y., Rochester — New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, bids in May or June, constructing steel, concrete underpass under tracks at Blossom Rd. $350,000. Noted Nov. 17, 1933, C. D.—Nov. 23, 1933, E. N.-R.

North Dakota — State Hy. Dpt., Bismarck, soon takes bids constructing deck girder and I-beam steel bridge over Red River, between Fargo, N. D., and Moorhead, Minn., $250,000; constructing pedestrian underpass under Northern Pacific R.R. tracks at Mandan, $26,500; overhead grade separation structure at Surrey, $39,750; and overhead grade separation over Minneapolis, St. Paul & Sault Ste. Marie Ry. tracks, at Rogers, $49,600.

Wash., Port Orchard—Kitsap Co. plans 1,000 ft. bridge to have 300 ft. cantilever span in center and 350 ft. support runway on either side on Agate Pass. $125,000. Financing sought. A. Witting, Port Orchard, engr.

Wash., Tacoma—Pierce Co. submits plans to State Hy. Dpt. for approval, for 550 ft. rein.-con. bridge over Purdy Sandspit. $62,000. E. R. Easterday, Court House, engr.

Ont., Middlemiss—Middlesex and Elgin Counties making plans constructing 2 span, 312 ft. steel bridge to replace old bridge over Thames River. $45,000. F. A. Bell, Court House, St. Thomas, engr.

Ont., Morrisburg—Canadian National Ry., T. T. Irving, ch. engr. (central region), Union Station, Toronto, plans subway under Canadian Natl. Ry. tracks at highway. $105,000. Noted Oct. 9, C. D.—Oct. 17, E. N.-R.

BIDS ASKED

†Arizona and California—Apr. 15, by Bureau Reclamation, Denver, Colo., furnishing structural steel for railroad bridge at Station 1029+48.58 and for highway bridge at Station 1035+47 of All American Canal System, R. F. Walter, Custom House, Denver, Colo., dist. engr.

Calif., Los Angeles—City bids about **May 13**, constructing 2 foot bridges over Ramona Blvd., concrete footings and steel superstructure, 1 bridge at Pomeroy St., to be 170 ft. long, 5 ft. wide, 100 ft. main span; one bridge at Echandia St., to be 225 ft. long, 5 ft. wide, 114 ft. main span. $85,000. L. Aldrich, city engr. R. W. Stewart, City Hall, bridge engr.

Indiana—Apr. 7, by State Hy. Comn., Indianapolis, constructing 60 ft. steel beam and 32 ft. rein.-con. girder bridges, over Cornstalk and Little Raccoon Creeks, near Ladoga, Montgomery Co.; rein.-con. arch and 1 rein.-con. girder bridges over Little Raccoon Creek, Montgomery Co.; 60 ft. steel beam and rein.-con. bridge over Spring Creek, Rural Dist. State Rd. 5, Whitley Co.; 54 ft. steel I-beam bridge on concrete piling, 28 ft. rein.-con. girder bridge and 105 ft. steel beam bridge on creosoted piling, 2 bridges over Pigeon Creek, and 1 over Douglas Ditch, Owensville and Fort Branch, Gibson Co.; 40 ft. rein.-con. arch and 8x6 ft. rein.-con. box culverts over Holthouse and William Smith Ditches, on State Rd. 124, Decatur and Rural Dist., Adams Co.; 100 ft. steel beam rein.-con. bridge over Mud Creek, Homer, Rush Co.; 60 ft. steel beam, two 30 ft. rein.-con. arch bridges over Willow, Harrell and Chippewanuck Creeks, near Rochester, Fulton Co.; two 60 ft. steel beam bridges over Yellow Creek, near Mentone, Fulton Co.; one 60 ft. and one 36 ft. bridges over Little Birch and Prairie Creeks, south of Brazil, Clay Co.; 202 ft. steel beam, rein.-con. bridge over B. & O. R.R., Kimmell, Noble Co.; 75 ft. and 220 ft. steel beam bridges on creosoted wood piling over Big Creek and Old and New Channels, near Lynnville, Warrick Co.; 30 ft. rein.-con. arch, 150 ft. steel beam and 28 ft. rein.-con. girder bridges over Barn Branch, Pigeon Creek and Old Pigeon Creek Overflow, along State Rd. 57, Rural Dist., Gibson and Warrick Counties; 70 ft. steel beam bridge, creosoted wood piling over Lutz Ditch, Rural Dist., Gibson Co.; 202 ft. steel beam bridge on creosoted piling and 216 ft. rein.-con. girder bridges over C. S. S. and S. B. Ry. and Grand Calumet River, Gary, Lake Co.; 150 ft. steel girder bridge under Michigan Central Ry., South Bend, St. Joseph Co.; 38 ft. steel beam bridge under New York Central Ry., east of Otis, LaPorte Co.; 38 ft. steel beam bridge under C. & E. I. Ry., east of Clinton, Parke Co.; 156 ft. rein.-con. bridge over C. M. St. P. & P. Ry., east of Burns City, Martin Co.; 140 ft. steel beam bridge on creosoted wood piling over Hurricane Creek, Rural Dist. Rd. 41, Gibson Co.; 191 ft. steel beam bridge over Old Pigeon Creek, Old Channel, Rural Dist. 57, Warrick Co.; 75 ft. steel beam bridge, creosoted wood piling over West Fork Thurman Creek and East Fork Thurman Creek, Rd. 41, Vigo Co.; 48 ft. rein.-con. girder bridge over Spy Run Creek, Fort Wayne, Allen Co. M. R. Keefe, state hy. engr.

Iowa—Mar. 31, by State Hy. Comn., Ames, constructing 11 rein.-con. pipe and 17 rein.-con. box culverts on Primary Rd. 10, between Strawberry Point and Edgewood, FA-579-ABC, Clayton and Delaware Counties, incl. 253 cu. yd. Class 1 excav.; one 150x20 ft. continuous I-beam bridge on secondary road, south of Bloomfield, WPSO-550-C, Davis Co., 240 cu.yd. Class 1 and 120 cu.yd. Class 2 excav.; one 40x24 ft. skew I-beam bridge on relocation of Primary Rd. 175, from U. S. Rd. 65 west, WPGS-597-G, Hardin Co., 190 cu.yd. Class 1 and 205 cu.yd. Class 2 excav.; 134x24 ft. continuous I-beam overpass structure approach, paving and temporary detour U. S. Rd. 6, C.M., St. P. and P. Ry. crossing east of Homestead, Iowa Co., 290 cu.yd. Class 1 excav. and 4,555 cu.yd. excav.; 5 pipe and 6 concrete box culverts on Primary Rd. 9, from Sibley West, Osceola Co., 185 cu.yd. Class 1 excav. and 215 cu.yd. fill; 6 corrugated metal pipe culverts and 1 rein.-con. box culvert extension, secondary road along south side Sects. 1, 2 and 3 and east of Sects. 23, T81N, Poweshiek Co., 95 cu.yd. Class 1 excav. and 240 cu.yd. fill; one 223x24 ft. multiple span overhead crossing structure on Primary Rd. 181 at C. R. I. and P. Ry. crossing, north of Dallas and Melcher, Marion Co., 985 cu.yd. Class 1 excav. F. R. White, state hy. engr.

Louisiana — Apr. 8, by State Hy. Comn., Baton Rouge, overpass of Texas & Pacific R.R. and Louisiana, Arkansas and Texas R.R., WPGH 160, consisting of six 36 ft. 9 in. rein.-con. deck girder approach and two 57 ft. I-beam spans on rein.-con. bents with concrete piling foundations, on Shreveport-Texas Hy., Project 1854, Route 1, Caddo Parish; constructing Louisiana & Arkansas R.R. overpass and approaches, consisting of eight 40 ft. 9 in. and eleven 36 ft. rein.-con. deck girder approach spans, and one 72 ft. I-beam span, supported on rein.-con. bents, with concrete piling found., on Baton Rouge-Essen Hy., Route 275, State Project 2653, U. S. Works Program Grade Crossing Projects WPGM and S 321, 275, East Baton Rouge Parish.

Louisiana — Apr. 15, by State Hy. Comn., Baton Rouge, constructing grade crossing, consisting of eight rein.-con. deck I-beam approach spans on steel towers, each 30 ft. long and one I-beam span 70 ft. long, rein.-con. piling foundation, concrete approaches over Missouri R.R. and approaches on 0.365 mi. hy. south of Corey, on Columbia-Monroe Hy., Project 2002, W.P.A. 14-A.

Mo., St. Louis—Apr. 10, by Bd. P. Service, City Hall, fabricating, delivering steel superstructure for South Valley Junction approach to St. Louis Municipal Bridge, $68,000; erecting, painting steel superstructure, $20,000; furnishing, delivering railroad track materials for St. Louis Municipal Bridge and approaches, Groups (A) $26,200 (B) $4,500 (C) $6,200 (D) $7,000 (E) $8,100 (F) $2,700 (G) $38,400 (H) $45,200 (I) $12,600 (J) $141,000. Total $379,900. P.W.A. project. C. E. Smith & Co., Railway Exch. Bldg., engr. Noted Mar. 23, C. D.

Nevada—See "Contracts Awarded."

New Jersey—Apr. 6, by E. D. Sterner, state hy. comr., Trenton, reconstructing 136 ft., rein.-con. frame county hy. overpass across tracks of D. L. & W. R.R. near Towaco Station, Montville Twp., Morris Co., incl. 10,700 borrow; adv. E. N.-R., Mar. 26.

★**New York**—Lake Champlain Bridge Comn., c/o M. Y. Ferris, Ticonderoga, bids about Mar. 25, constructing embankment and 15 piers for Rouses Point Bridge over Lake Champlain, Contrs. 2, 3 and 4, from Rouses Point, N. Y. to Alburg, Vt., $700,000. Fay, Spofford & Thorndike, 44 School St., Boston, Mass., engrs. Noted Feb. 4, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

New York—See "Streets and Roads."

N. Y., New York—Apr. 10, by Transit Comn., 270 Madison Ave., reconstructing bridge carrying River Ave. over tracks of Hudson Electric Div. of New York Central R.R., bridge carrying East 161st St. over Harlem-Electric Div. of same railroad; bridge carrying East 169th St. over same railroad; bridge carrying East 180th St. over same railroad; bridge carrying East 156th St. over Port Morris Branch of same railroad; bridge carrying Southern Blvd. over same railroad, all with related structures, all Bronx Boro; adv. E. N.-R., Mar. 26.

★**N. Y., Syracuse**—State Dpt. P. Wks., Albany, bids about Apr. 15, constructing traffic underpass and subway under Geddes St. and New York Central and Delaware, Lackawanna & Western R.R. tracks. $1,300,000.

Ohio—See "Streets and Roads."

Pennsylvania—See "Streets and Roads."

Tennessee—See "Streets and Roads."

Federal Government.

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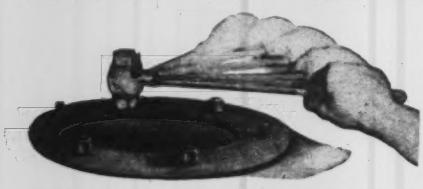

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BROWNING SHOVELS

Bridges, etc. (Cotninued)

Wisconsin—Apr. 3, by State Hy. Comn., Madison, sand blasting and repainting Monterey Bridge in Janesville; Newville Bridge in Fulton; and Turtle Creek Bridge in Beloit, all foregoing Rock Co.; Spring Green Flood Bridge in Spring Green, Sauk Co.; 22nd Street Bridge in Two Rivers, Manitowoc Co.; Kewaunee Bridge, in Kewaunee, Kewaunee Co,; Cornell Bridge in Cornell, Chippewa Co.; Brule River Bridge in Tipler, Florence Co.; Center Ave. Bridge in Merrill, Lincoln Co.

CONTRACTS AWARDED

Ariz., Douglas—State Hy. Dpt., Phoenix, constructing underpass on Benson Douglas Hy., to J. A. Casson, P. O. Box 2293, Phoenix, $122,685. Est. $125,000. Bids Mar. 10. Noted Feb. 26. C. D.

★ **Connecticut**—At office of J. A. Macdonald, comr. State Hy. Dpt., Hartford, two 600 ft. steel arches on concrete piers and 28 plate girder approach spans over Connecticut River, between Middletown and Portland, involving 40,000 bbl. cement, 4,600 cu.yd. stone, 1,140,000 lb. deformed bars, 1,400,000 lb. steel in caissons, 2,513,000 lb. steel bearings, etc., substructure, to Merritt, Chapman & Scott, 292 Pequot Ave., New London, and 17 Battery Pl., New York, $1,028,303; superstructure to Bethlehem Steel Co., 8th and Lehigh Sts., Bethlehem, Pa., $1,085,594. Est. $3,000,000. Bids Mar. 9. Noted Mar. 11. C. D.—Mar. 19. E. N.-R.

★ **Illinois**—Dpt. P. Wks. & Buildings, Div Hys., Springfield, to G. D. Hardin, 3139 South Indiana Ave., Chicago, constructing substructure for viaduct in DuPage Co., $23,307 ***to Mississippi Valley Structural Steel Co., Melrose Park, superstructure same bridge, $21,261; furnishing structural steel for viaduct in Wabash Co., $10,228; superstructure for subway structures in St. Clair Co., $43,138***to Van Etten Bros. Building, Inc., 11024 South Michigan Ave., Chicago, viaduct Cook Co., $20,606; 2 bridges Kendall Co., $8,776***to Zieber Steel Co., 4623 West Harrison St., Chicago, superstructure for bridge in Cook Co., $29,394 ***to Joliet Bridge & Constr. Co., Joliet, viaduct in Cook Co., $121,301***to Cephus Williams, Streator, substructure for bridge in LaSalle Co., $10,918***to O. Daniels Co., 135 South LaSalle St., Chicago, concrete floor for bridge in Fulton and Mason Counties, $39,766***to Overland Constr. Co., 205 West Wacker Dr., Chicago, painting steel bridge in Fulton and Mason Counties, $6,915***to Woden Allen Co., 208 South LaSalle St., Chicago, superstructure for bridge in Perry Co., $24,855***to Vincennes Steel Bridge Co., Vincennes, Ind., superstructures for 2 bridges in Logan and Tazewell Counties, $58,494***to Cunningham Bros., Sumner, bridge in Hamilton Co., $5,826***to Midland Structural Steel Co., Cicero, superstructure for viaduct in LaSalle Co., $17,648***to Duffin Iron Co., 37 West Van Buren St., Chicago, bridge in Fulton Co., $167,757***to F. Lorenz, Inc., Chicago Heights, bridge in St. Clair Co., $54,986. Grand total $665,176. Bids Nov. 8, 15, 27, Jan. 17 and 31. Noted Nov. 4, Jan. 9 and 27. C. D.—Jan. 30. E. N.-R.

Ill., Decatur—Dpt. P. Wks. & Buildings, Div. Hys., constructing one 41 ft. through girder bridge, Sect. 7B-CS, to C. R. Miller & Sons, Inc., Decatur, $60,848. Bids Feb. 3.

Mass., Concord—See "Streets and Roads."

Mississippi—See "Streets and Roads."

Missouri—State Hy. Dpt., Jefferson City, constructing bridges over Drainage Ditch 72, over Drainage Ditch 74, over Drainage Ditch 73, Pemiscot Co., to Skrainka Constr. Co., Security Bldg., St. Louis***over Spring Branch and over branch of Crooked River, Caldwell Co., to C. H. Atkinson Paving Co., Chillicothe ***over overflow of Fishing River, Clay Co., to O. W. Knutson, 3520 Main St., Kansas City ***over Muddy Creek, Saline Co., to G. Knutson, 3520 Main St., Kansas City***2 bridges over branch Jefferson Co., to Kelly & Underwood, Granby***bridges over branch, over Big Dry Wood Creek, and over McKill Creek, all foregoing Barton Co., to Trinidad Asphalt Mfg. Co., Merchants Laclede Bldg., St. Louis***over branch St. Charles Co., to Neyer Constr. Co., Billings***over Second Creek, Gasconade Co., to W. J. Menefee Constr. Co., Sedalia***over outlet of Big Lake Holt Co., to T. J. Morris, St. Joseph***over St. Louis, San Francisco R.R., Barry Co., to J. C. Ault, Caseville***over St. Louis, San Francisco R.R., Hornell Co., to Garrett Constr. Co., Springfield***rein.-con. deck girder bridges over A. T. & S. F. R.R., Knox Co., to Ebbe Constr. Co., Trenton***over St. L. S. F. R.R., Barry and Lawrence Counties, to Hedges Weeks Constr. Co., and Benson-Kaiser Co., Merchants Laclede Bldg., St. Louis. Noted Dec. 6. C. D.

Nevada—State Hy. Comn., Carson City, constructing bridge on state hy., 1 mi. south of Gardnerville, incl. 3,300 cu.yd. roadway and 480 cu.yd. structural excav., day labor. R. A. Allen, Heroes Memorial Bldg., Carson City, state hy. engr.

New Jersey—State Hy. Dpt., Trenton, steel, iron bridge on Route 25, Bordentown, to Crystal Lake, Burlington Co., to Kolyn Constr. Co., 150 East State St., Trenton, $40,404. Noted Jan. 16. C. D.—Jan. 23. E. N.-R.

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N. J., Newark—J. Rich Steers, Inc., general contractors, 17 Battery Pl., New York, bridge lets contract for 200 tons reinforcing steel for bridge for Pennsylvania R.R. Co., to Igoe Bros. Co., 234 Poinier Ave., Newark.

New York—Dpt. P. Wks., Albany, bridges in Delaware Co., to O. P. Williams Constr. Co., Inc., Oneonta, $28,700 est. $32,407***Allegany Co., to Maple City Lumber & Supply Co., Inc., Hornell, $29,321 est. $35,754***Delaware Co., to Howes & Farrell, Sidney Center, $41,705 est. $52,070***Chenango Co., to E. G. DeLia, New Hartford, $79,856 est. $93,266***Ulster Co., to W. Van Kleek, New Paltz, $119,744 est. $146,783***Chautauqua Co., to L. C. Whitford, Wellsville, $191,836 est. $230,245. Grand total $491,212. Bids Mar. 10. Noted Mar. 17. C. D.—Feb. 20. E. N.-R.

New York—Tully & DiNapoli, general contractors, 30-11 12th Ave., Long Island City, 4,000 tons reinforcing steel for approaches for Triborough Bridge, connecting Manhattan, Bronx and Queens Boros., for Triborough Bridge Authority, 111 8th Ave., New York, to Jones & Laughlin Steel Corp., 3rd and Ross Sts., Pittsburgh, Pa. Noted Feb. 20 and Feb. 28. C. D.—Feb. 27 and Mar. 5. E. N.-R., under "Contracts Awarded."

New York—A. A. Volk, Inc., general contractors, 1819 Bway., New York, 2,115 tons reinforcing steel for anchorage and paving of Triborough Bridge, connecting Manhattan, Bronx and Queens Counties, for Triborough Bridge Authority, 111 8th Ave., New York, to Concrete Steel Co., 2 Park Ave., New York. Noted Feb. 18. C. D.—Feb. 20. E. N.-R., under "Contracts Awarded."

Oregon—See "Streets and Roads."

Pennsylvania—W. Van Dyke, secy. Hys., Harrisburg, 893 ft. rein.-con. bridge and grading, drainage Route 19065, Sect. 1, Pine Twp., Columbia Co., to Central Builders Supply Co., Sunbury, $8,109***through steel truss bridge, rein.-con. paving 0.37 mi. Route 103, Sect. 2, Elkland Twp., Elkland Boro, Tioga Co., to Graham Constr. Co., Box 317, Lancaster, $78,257***reconstructing bridge floor of existing bridge and resurfacing existing brick pavement with bituminous surface 0.4 mi. Route 96, Warren Boro, Warren Co., to Farris Eng. Co., Empire Bldg., Pittsburgh, $10,508. Grand total $96,874. Bids Mar. 6. Noted Mar. 12. C. D.—Feb. 20. E. N.-R.

South Dakota—State Hy. Comn., Pierre, overhead crossing in Deuel Co., to Watertown Cement Products Co., Watertown, $16,576*** bridge in Lyman Co., to W. Bonesteel, Wagner, $14,773***190 ft. overhead crossing and 150 ft. overhead crossing, in Corson Co., to M. A. Stump, Mobridge, $22,900 and $18,615 respectively***bridge in Sully Co., to A. D. Hyde, Watertown, $5,466. Grand total $78,330. Bids Mar. 11. Noted Mar. 4. C. D.—Mar. 12. E. N.-R.

Texas—G. Gilchrist, state hy. engr., Austin, constructing small and large structures on Hy. 19, W.P.M.H. 519-A and C from Halls Bayou to Spring Creek, Harris Co., to J. F. Buckner, Cleburne, $79,264. Est. $80,000. New P.W.A. Bids Mar. 12. Noted Feb. 21, C. D.

Vermont—State Hy. Dpt., Montpelier, 0.6 mi. steel truss bridge with gravel approaches, etc., Malletts Bay Rd., Burlington and Colchester, Project WPMS 185-A, to Chas. I. Hosmer, Inc., 87 Prospect St., Greenfield, Mass., $109,917 using gravity type piers. Bids Mar. 6, awarded Mar. 11. Noted Mar. 10, C. D. — Feb. 27. E. N.-R.

Virginia — State Hy. Dpt., Richmond, constructing bridges in Page Co., to Boston Constr. Co., South Boston, $20,355***Page Co., to W. D. Dean, Richmond, $13,121***Augusta Co., to R. W. Moore & Co., Staunton, $81,183***Culpeper Co., to Spotsylvania Constr. Co., Alexandria, $71,972***Roanoke Co., to M. S. Hudgins, Roanoke, $11,158. Grand total $197,789. Bids Mar. 17. Noted Mar. 3. C. D.—Mar. 5. E. N.-R.

Va., West Point—State Hy. Comn., Richmond, repairing Bruce Bridge over Pamunkey River, to Tidewater Constr. Co., Norfolk, $43,349.

STREETS AND ROADS

BIDS ASKED

Arizona—Apr. 3, by State Hy. Dpt., Phoenix, grading, draining, oiling 14 mi. Casa Grande-Sacation Hy., Pinal Co. T. S. O'Connell, Phoenix, engr.

Arizona—Apr. 7, by State Hy. Dpt., Phoenix, grading, draining, concrete surfacing 0.4 mi. 16th St.—Hy. 80, adjoining Douglass Underpass. $107,000. T. S. O'Connell, state hy. engr.

†**Arizona**—Pub. Rds., Phoenix, rejected bids Feb. 25, crushed rock base course treated with asphaltic road materials 9.141 mi. Coconino Co. $68,993. Will readvertise. Noted Feb. 13, C. D.

Conn., Ansonia — City taking bids rein.-con. paving Liberty St.; bituminous macadam paving Main St.; widening Jewett St. To exceed $25,000. V. B. Clarke, Capitol Bldg., engr.

Streets and Roads (Continued)

Conn., Bristol—See "Contracts Awarded."

Conn., Rockville—See "Contracts Awarded."

Florida—Apr. 2, by State Rd. Dpt., Tallahassee, C. B. Treadway, chn., J. H. Dowling, state hy engr., concrete paving, etc. 2.041 mi. State Road No. 4, in Miami, between Northeast 36th St. and Northeast 38th St., WPMH 41-C and WPMH 108-A, Dade Co.; 6 in. sand bituminous road mix pavement 4.027 mi. State Road 211, WPSO 180, Alachua Co.

Idaho—Apr. 3, by State Hy. Comn., G. E. McKelvey, comr. P. Wks., Boise, roadbed, drainage structures, crushed rock surfacing 1.604 mi. Coeur d'Alene Valley Hy., Cave Lake-Medicine Lake Section, Kootenai Co., incl. 40,000 cu.yd. solid rock, 45,000 cu.yd. common and 130 cu.yd. structure excav.

Indiana—Apr. 7, by State Hy. Dpt., Indianapolis, rock asphalt resurfacing 1.983 mi. road from Wabash to point 2 mi. northwest, R-1333, F.A. 405D, Wabash Co.; bituminous surfacing 6.275 mi. feeder rd., Jamestown to point 2 mi. north of Advance, R-1337, WPSO- and WPMS 553 A, and 7.187 mi. feeder road 2 mi. north of Advance to Thorntown, both Boone Co.; rein.-con. and rock asphalt paving 2.254 mi. S.R. 27, from Murray and Clinton Sts., in Fort Wayne to south city limits, R.1338, WPMH-575C, Allen Co.; 2.326 mi. New Castle North, R-1356, WPH and WPMH 593-A, Henry Co.; bituminous retread paving 2.806 mi. relocation at Borden, R-1357, WPGS 472, Clark Co.; 0.456 mi. S.R. 46, North Walnut St., in Bloomington, Monroe Co.; rein.-con. paving and repaving 1.74 mi. Industrial Hy., in Gary, from points 1 mi. north to 0.7 mi. south of E. J. & E. Railroad, N.R.M. 367 B; 0.657 mi. S.R. 12, 0.7 mi. south of E. J. and E. R.R., to Birch Ave. in Gary, R-1359, N.R.M. 367; 0.482 mi. S.R. 12, from Industrial Hy. at Birch Ave. to point 0.3 mi. west of Penn. R.R. on 4th Ave., Gary, all foregoing Lake Co.

Ind., Union City—See "Contracts Awarded."

Iowa—Mar. 31, by State Hy. Comn., Ames, paving 8.258 mi. Primary Rd. 10, from Strawberry Point to Edgewood, Clayton and Delaware Counties, incl. 103,209 cu.yd. excav.; 0.316 mi. U. S. Rd. 20, in Manchester, U.S.W.P. 4-D, Delaware Co., 1,665 cu.yd. excav.; 0.27 mi. U. S. Rd. 6, WPMH-289-C, Johnson Co., 1,033 cu.yd. excav.; 0.411 mi. Primary Rd. 1, in Iowa City, Johnson Co., 3,061 cu.yd. excav.; 0.71 mi. U. S. Rd. 34 in Albia, WPMH-20, Monroe Co., 2,227 cu.yd. excav.; 5.249 mi. Primary Rd. 9 from Sibley West, Osceola Co., 88,447 cu.yd. excav.; grading 0.265 mi. secondary road between Sects. 3 and 4, T89N, R14W, Black Hawk Co.; grading, graveling approach for overpass, Black Hawk Co., 50,067 cu.yd. excav.; 0.555 mi. secondary road, Sect. 20, T92N, R20W, C. R. I. and P. Ry. Crossing, Franklin Co., 38,170 cu.yd. excav.; 0.312 mi. Grade Crossing Project WPGS-646, secondary road, Franklin and Wright Counties, 32,185 cu.yd. excav.; 0.227 mi. secondary road between Sects. 19 and 30, T87N, R19W, Mardin Co., 39,729 cu.yd. excav.; 0.249 mi. secondary road Sect. 31, WPGS-641, Hardin Co., 40,586 cu.yd. excav.; 0.747 mi. secondary road, west of Richland, WPSO-588-D, Keokuk Co., 21,299 cu.yd. excav.; 0.488 mi. secondary road, between Ollie and Richland, Keokuk Co., 21,518 cu.yd. excav.; 0.586 mi. secondary road, south of Sect. 1, WPGS-609-AB, Monroe Co., 75,539 cu.yd. excav.; 3.518 mi. secondary road south of Sects. 1, 2 and 3, WPSO-616-AB, Poweshiek Co., 21,343 cu.yd. excav.; graveling 2.5 mi. U. S. Rd. 6, C. R. I. and P. Ry., east of Atlantic, Cass Co.; 3.5 mi. detour on local county roads, Primary Rd. 3, northwest of Nebraska City Junction, Fremont Co.; 4.686 mi. secondary road, betwen Ollie and Richland; 0.747 mi. secondary road, WPSO-588-D; 0.488 mi. secondary road, between Ollie and Richland, all foregoing Keokuk Co.; 3 mi. Primary Rd. 3, east of Shenandoah at Wabash Ry. overpass, Page Co.; 3.518 mi. secondary road, south of Sects. 1, 2 and 3, and east of 25, Jefferson Twp., Poweshiek Co.; 0.303 mi. Primary Rd. 181, north of Dallas and Melcher, Marion Co., 38,890 cu.yd. excav. F. R. White, ch. engr.

Kan., Kansas City—See "Contracts Awarded."

Mass., Andover—See "Contracts Awarded."

Mass., Belmont—See "Contracts Awarded."

Mass., Chelmsford—See "Contracts Awarded."

Mass., Concord—See "Contracts Awarded."

Mass., Gloucester—See "Contracts Awarded."

Mass., Hull—See "Contracts Awarded."

Mass., Marblehead—See "Contracts Awarded."

Mass., Milford—See "Contracts Awarded."

Mass., Milton—See "Contracts Awarded."

Mass., Randolph—See "Contracts Awarded."

Mass., Reading—See "Contracts Awarded."

Mass., Southbridge—See "Contracts Awarded."

Mass., Stoneham—See "Contracts Awarded."

†*Federal Government.*

Mass., Wellesley—See "Contracts Awarded."

Nevada—Apr. 8, by State Hy. Comn., Carson City, constructing rein.-con., steel overpass over Western Pacific R.R. in Winnemucca, Route 8, Sect. A-1, Humboldt Co., incl. 750 cu.yd. structural excav., concrete, steel bridge over Humboldt River on same road, incl. 9,372 cu.yd. roadway and 1,250 cu.yd. structural excav. R. A. Allen, state hy. engr.

New Jersey—E. D. Sterner, state hy. comr., Trenton, returned bids to have been opened Mar. 16, for improving Route 44 from Oldmans Creek to Penns Grove, Salem Co., and Route 25 from Burlington to Crystal Lake, to contractors because of diversion of funds from Highway Dpt. to relief. Noted Feb. 27. C. D. —Mar. 5, E. N.-R.

New York—Apr. 7, by A. W. Brandt, comr. Hys., Albany, paving 3.65 mi. road in Albany Co.; graveling 4.74 mi. Chemung Co.; 4.47 mi. Wyoming Co.; constructing 30 and 36 ft. I-beam bridge, box culverts and graveling 0.62 mi. road in Steuben Co.; reconstructing 60 ft. girder bridge in Allegany Co.; roadside improvement in Livingston and Ontario Counties; 12 and 32 ft. bridges on 1.26 mi. Delaware Co.; 80 ft. girder bridge in Montgomery Co.; adv. E. N.-R., Mar. 26.

N. Y., Ardsley—See "Contracts Awarded."

N. Y., Cairo—See "Contracts Awarded."

N. Y., Caroline—See "Contracts Awarded."

N. Y., Colonie—See "Contracts Awarded."

N. Y., Greenburgh—See "Contracts Awarded."

N. Y., Hamburg—See "Contracts Awarded."

N. Y., Malone—See "Contracts Awarded."

N. Y., Marilla—See "Contracts Awarded."

N. Y., Sodus—See "Contracts Awarded."

N. Y., Windham—See "Contracts Awarded."

†**North Carolina**—Apr. 20, by Pub. Rds., Roanoke, improving 14 mi. road in Blue Gap to Bull Gap, Section P, Parkway Project, Buncombe Co. H. J. Spelman, Roanoke, Va., engr.

Ohio—J. Jaster, Jr., dir. Hys., Columbus, did not open bids received Mar. 17 for roadside improvement 1.966 mi. Summit Co.; grading, drainage structures, widening, cold mixed paving, and constructing concrete bridge with continuous steel beams over Big Walnut Creek at Columbus Airport, 1.59 mi. Franklin Co.; received no bids Mar. 17, grading, drainage, brick paving, constructing stonefaced, concrete filled spandrel bridge, 0.104 mi., Cuyahoga Co.; relocating, grading, drainage structure, brick paving, and constructing steel truss bridge with two concrete approach spans, 1.724 mi., Coshocton Co.; grading, drainage, traffic bound paving 0.814 mi. Beach City to Dundee and Reese Rd.; 0.802 mi. Winesburg-Dundee Rd.; 0.653 mi. Sect. B, Bresser-Shanesville Rd., all foregoing Tuscarawas Co.; roadside improvement 1.33 mi. Sect. K, Cleveland-Buffalo Rd., Ashtabula Co.; grading, drainage structures, hot mixed paving 1.568 mi. Bryan-Napoleon Rd., Williams Co., Proposal 1, 0.784 mi. same road, Proposal 2, will readvertise.

Pennsylvania—Apr. 3, at office W. Van Dyke, secy. Hys., Harrisburg, rein.-con. paving, incl. rein.-con. bridge 5,708 ft. R-545, Sect. 4, South Fayette Twp., Allegheny Co., involving 38,138 cu.yd. Class 1 and 1,384 cu.yd. Class 2 excav.; rein.-con. paving, bituminous surfacing, etc. 13,344 ft. R-806, Sect. 1, R-02060, Upper St. Clair, Bethel and Mt. Lebanon Twps., Allegheny Co., 158,948 cu.yd. Class 1, 4,358 cu.yd. and Class 2 and 781 cu.yd. borrow excav.; rein.-con. rigid frame overpass bridge, rein.-con. paving 1,302 ft. R-295, Sect. 3, Platea Borough, Erie Co.; 638 cu.yd. Class 1, 1,341 cu.yd. Class 2 and 6,735 cu.yd. borrow excav.; plate girder and rein.-con. bridge, bituminous on native stone or modified crushed aggregate surfacing, shoulder grading 7,135 ft. R-444, Sect. 1, 37010 Spur E, Mahoning Twp., Lawrence Co., 65,535 cu.yd. Class 1, 6,955 cu.yd. Class 2 and 68,447 cu.yd. borrow excav.; fabrication and erection of deck plate girder and deck truss underpass bridge, widening existing pavement on each side with bituminous on crushed aggregate surfacing 240 ft. Cheltenham Ave., Cheltenham Twp., city of Phila., Montgomery and Philadelphia Counties, 1,650 cu.yd. Class 1 and 4,580 cu.yd. Class 2 excav.; reconstructing existing drainage structures and replacement of existing pavement over pipe trenches with bituminous surface on native stone base R-279, Conewango Twp., Warren Co., 210 cu.yd. Class 1 and 725 cu.yd. Class 2 excav.; bituminous on native stone surfacing 3,165 ft. R-450, Sect. 1, Preston Twp., Wayne Co., 1,446 cu.yd. Class 1, 429 cu.yd. Class 2 and 2,294 cu.yd. borrow excav.

Pa., Johnstown—See "Contracts Awarded."

Tennessee—Apr. 3, by State Hy. Dpt., Nashville, paving 0.626 mi. State Hy. 3, W.P.H. 32, Lauderdale Co.; 1.42 mi. State Hy. 3, F.A.P. 32, Lauderdale Co.; 5.292 mi. State Hy. 112, W.P.H. 39-H, Davidson Co.; grading, drainage 1.876 mi. State Hy. 41, W.P.H. 265-B, Sumner Co.; 2.179 mi. State Hy. 53, W.P.S.S. 293-C, Jackson Co.; 1.5 mi. State Hy. 52, W.P.S.S.

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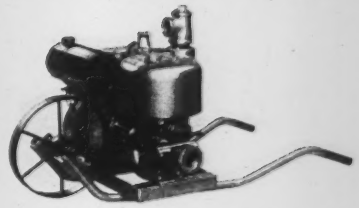

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Streets and Roads (Continued)

406-F, Fentress Co.; overhead and approaches over Southern R.R., State Hy. 57, in Pocahontas, W.P.G.S. 291-C, Hardeman Co.; overhead and approaches on 0.523 mi. State Hy. 63, W.P.G.S. 480-A, Campbell Co.

Utah, Salt Lake City — See "Contracts Awarded."

Wash., Olympia—Apr. 6, by Thurston Co. Comn., grading and crushed gravel surfacing 7.81 mi. Boston Harbor, Calvin-Mason and Shincke Rds. N. R. McKay, Court House, Olympia, engr.

CONTRACTS AWARDED

Conn., Bristol — City, improving 7,500 ft. King Rd., $23,053; and 8,000 ft. Red Stone Hill Rd., $20,599, W.P.A. labor. D. J. Donovan, supt. P. Wks. S. A. McGann, City Hall, W.P.A. engr.

Conn., Rockville—City, improving Rockville-Somers Rd. to Crystal Lake, W.P.A. labor. Bd. Selectmen, Rockville. $32,000. M. A. Daley, W.P.A. Administrator, 1044 Chapel St., New Haven.

Illinois — Dpt. P. Wks. & Buildings, Div. Hys., Springfield, grading 3.74 mi. Lake and Cook Counties, to Capshull & Co., Deerfield, $109,749***0.19 mi. Wabash Co., to Harrelson & Johnson, Harrisburg, $7,869***0.53 mi. St. Clair Co., to Hoeffkin Bros., Belleville, $112,098***3.68 mi. Mercer Co., to Central Eng. Co., Davenport, Ia., $52,028***road in Kendall Co., to Illinois Hydraulic Stone & Constr. Co., Elgin, $115,378. Grand total $397,122. Bids Dec. 6, Jan. 17 and 31. Noted Jan. 9 and 27. C. D.—Jan. 30, E. N.-R.

Ind., Union City — City, constructing sidewalks, day labor, $30,000. **W.P.A.** project.

Kan., Kansas City—Bd. Educ., 1 in. rock asphalt on 5 in. rock paving on various playgrounds of schools, **W.P.A.** labor. $90,000.

Md., Hyattsville—Mayor and Common Council, grading, curbing, guttering, sidewalks, 12,850 sq.yd. concrete paving and 9,750 sq.yd. bituminous concrete surface course paving streets, to Wilmoth Paving Co., Tower Bldg., Wash., D. C., $44,784. **P.W.A.** Bids Mar. 9. Noted Mar. 16, C. D.—Feb. 27, E. N.-R.

Mass., Andover—Town, F. H. Hardy, chn. Bd. Selectmen, Town Hall, hy. maintenance $56,500, new hy. construction $12,000, park maintenance $6,088, playground maintenance $1,750, day labor. Grand total $76,338. Funds appropriated. G. Gilliard, chn. Bd. P. Wks. in direct charge.

Mass., Belmont—Town, J. W. Flett, chn. Bd. Selectmen, Town Hall, hy. maintenance $88,500, and hy. construction, $45,500, day labor during 1936. W. R. Thompson, supt. Streets.

Mass., Chelmsford—Town, H. C. Peterson, clk., hy. construction and maintenance, town labor during 1936. $28,800 appropriated.

Mass., Concord—Town, H. W. Brown, chn. Bd. Selectmen, Town Hall, hy. and bridge construction and maintenance, day labor during 1936. $60,230 appropriated.

Mass., Gloucester—City, W. V. Friend, mayor, City Hall, hy. construction and maintenance, day labor. $117,525.

Mass., Hull—Town, A. F. Pope, clk., Town Hall, hy. construction; $42,000 appropriated; and maintenance and oiling streets. $12,000 appropriated, day labor during 1936.

Mass., Marblehead—Town, R. Tutt, clk., Town Hall, hy. construction and maintenance, day labor. $42,492.

Mass., Milford—Town, E. C. Beaulac, supt. Streets, Town Hall, hy. maintenance, $51,900 appropriated; and hy. construction, $11,850 appropriated, day labor during 1936.

Mass., Milton—Town, J. Babcock, chn. Bd. Selectmen, hy. construction and maintenance, day labor during 1936. $77,931 appropriated.

Mass., New Bedford — Superintendent of Streets, City Hall, furnishing, laying approximately 2,500 tons 2 in. Type 8 hot asphaltic concrete on present base paving, Ashley Blvd., to Warren Bros. Roads Co., 36 Memorial Dr., Cambridge, $19,550. $25,000. Bids Mar. 6. Noted Mar. 10, C. D.

Mass., North Reading—See "Waterworks."

Mass., Randolph—Town, Bd. Selectmen, Town Hall, hy. construction and maintenance for year of 1936, town labor. $27,458 appropriated.

Mass., Reading—Town, H. W. Putnam, chn. Bd. P. Wks., Town Hall, hy. construction and maintenance, day labor. $66,052 appropriated.

Mass., Southbridge — Town, Bd. Selectmen, Town Hall, hy. maintenance, $23,000 appropriated, and new hy. construction. $10,000 appropriated, day labor during 1936.

Mass., Stoneham—Town, E. C. Hunt, chn. Bd. Selectmen, Town Hall, hy. maintenance, $63,667 appropriated, and new hy construction, $6,900 appropriated, day labor during 1936.

Mass., Wellesley—Town, W. A. Bennett, supt. Hys., Town Hall, hy. construction and maintenance, day labor during 1936. $145,740 appropriated.

Michigan—State Hy. Comn., Lansing, grading drainage structure 0.866 mi. WPH-19-32C, Clinton Co., to R. Sablain, Lansing, $39,16 Bids Feb. 6. Noted Feb. 14, C. D.

Mississippi—E. D. Kenna, state hy. dir., Jackson, grading drainage structures 2.692 mi. Winona-Grenda Hy., WPH 46-H and WPM 46-E, Montgomery Co., to Zeigler Constr. Co Nashville, Tenn., $34,843 est. $58,000***grading, drainage structures, bridges 7.842 mi. Hattiesburg-Seminary Hy., WPMH 71-D, Forres Co., to Council and Lewy, Greenville and E. Korsmo Constr. Co., Porter Bldg., Memphis Tenn., $119,636 est. $130,000***roadside improvement and beautification 3.161 mi. Mcdenhall-D'Lo Hy., NRH and M 200-A, Parts and 2, Simpson Co., to Winston & Griffith Many, La., $8,193 est. $2,500**grading, drainage structures, bridges 9.452 mi. Sandersville Heidelberg Hy., WPGH 123-127 and WPG 127, Jasper and Jones Counties, to Ball Contr Co., Fayette, $128,872 est. $125,000. Gran total $291,544. **P.W.A.** Bids Feb. 25, awarde Mar. 14. Noted Mar. 4, C.D.

★ **Missouri**—State Hy. Dpt., Jefferson City, to Kelly & Underwood, Granby, grading, paving 0.539 mi. Jefferson Co., $52,697; 0.809 mi. Jefferson Co., $32,022***to Skrainka Constr Co., Security Bldg., St. Louis, 0.547 mi. New Madrid Co., $27,472; 4.991 mi. Pemiscot Co $22,160; 4.057 mi. Pemiscot Co., $26,011*** to Chase Constr. Co., 5230a Devonshire St., St Louis, 1.308 mi. Grundy Co., $54,939***to F W. Whitehead, Kahoka, graveling or crushed stone surfacing 0.828 mi. Clark Co., $12,231 3.484 mi. Clark Co., $14,194***to Porter De Witt Constr. Co., Kirkwood, 1.681 mi. Miller Co., $9,640; 0.994 mi. Miller Co., $6,261*** to W. J. Menefee Constr. Co., Sedalia, 3.263 mi. Gasconade Co., $19,113; 0.26 mi. Gasconade Co., $12,927; 2.06 mi. Clark Co., $11,292*** to C. H. Atkinson Paving Co., Chillicothe, 2.954 mi. Caldwell Co., $35,359; 0.165 mi. Marion Co., $8,730***to Neyer Constr. Co., Billings 2.077 mi. St. Charles Co., $9,798; 3.045 mi. St. Charles Co., $14,721***to T. J. Morris, St Joseph, 4.181 mi. Holt Co., $16,548; 2.727 mi Holt Co., $5,515; 2.443 mi. Holt Co., $5,936; 1.074 mi. Holt Co., $3,383***to Cook & Cone Ottawa, Kan., 5 mi. Macon Co., $10,542; 3.382 mi. Macon Co., $7,128; 2.462 mi. Macon Co $5,240***to Vaughn Constr. Co., Kirksville 1.529 mi. Clark Co., $3,266; 1.652 mi. Clark Co., $3,532; 2.726 mi. Clark Co., $5,703*** to J. C. Ault, Cassville, grading 0.303 mi Barry Co., $45,692***to O. W. Knutson, 3520 Main St., Kansas City, 3.309 mi. Clay Co., $33,641***to Ebbe Constr. Co., Trenton, 0.537 mi. Knox Co., $38,496***to Trinidad Asphalt Mfg Co., 600 South Teresa St., St. Louis, 0.757 mi Barton Co., $31,232***to G. Knutson, 3520 Main St., Kansas City, 4.577 mi. Saline Co. $41,041***to Hedges Weeks Constr. Co., and Benson-Kaiser Co., Merchants LaClede Bldg., St. Louis, 0.321 mi. Barry and Lawrence Counties, $52,912***to R. Zinck, Appleton, 3.806 mi. Pulaski Co., $10,741***to Garrett Constr. Co., Springfield, 0.568 mi. Howell Co., $50,118 ***to Carle Harlin Constr. Co., West Plains, 2.32 mi. Oregon Co., $12,994***to Lee Van Horn, Jefferson City, 3.986 mi. Audrain Co., $8,967. Grand total $759,194. Bids Nov. 22, Dec. 20 and Jan. 31. Noted Nov. 21, Dec. 13 and Jan. 22, C. D.

New Mexico — State Hy. Comn., Santa Fe, grading, drainage structures, 2 course and double penetration surfacing 1.488 mi. road WPH 54 and WPGH 54, Hidalgo Co., to Brown Bros., Albuquerque, $39,046 est. $46,587*** grading, drainage structures, 1 steel and concrete bridge on 3.059 mi. road in Otero Co., to Hayner & Burn, Las Cruces, $91,788 est. $98,904. Bids Mar. 17. Rejected bids Mar. 17, improving roads in Taos Co., $88,907 and Santa Fe Co., $53,033. Noted Jan. 23, C. D.

New York—Dpt. P. Wks., Albany, roadside improving 0.02 mi. road in Washington Co., to F. E. Antolick, Schaghticoke, $15,980 est. $20,267***road in Genesee Co., to Four Winds Farms Nursery, Inc., Eggertsville, $56,094 est. $94,997***roads in Madison and in Ulster Counties, to Grand View Nurseries, Mount Vernon, $14,900 and $27,590 respectively, est. $19,048 and $37,142 respectively***road in Saratoga Co., to Flowerdale Greenhouses, Washington and Main Aves., Albany, $20,427 est. $30,144. Grand total $134,991. Bids Mar. 10. Noted Mar. 17, C. D.—Feb. 20, E. N.-R.

N. Y., Ardsley — Village, repairing, paving, guttering, draining, telford stone and native stone curbing Aqueduct St. from Ashford Ave. to Heatherhall Rd., relief forces. $23,000. **W.P.A.** D. Jordon, High School, White Plains, procurement officer W.P.A., will purchase materials.

N. Y., Cairo—Village, improving 100 acres land at southerly end of village, incl. laying 925 ft. 30 in. drain pipe, cleaning and excavating feeder ditches and culverts on 1.5 mi. Glenarie Park Rd., relief labor. **W.P.A.** $30,000. J. W. Carroll, Old Post Office Bldg., Albany, procurement officer W.P.A., will purchase materials.

N. Y., Caroline—Caroline Twp., constructing 3.6 mi. gravel road between Slatersville and

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†*Federal Government.*

Streets and Roads (Continued)

Caroline, relief labor. $25,000. **W.P.A.** A. Calabrico, Telephone Bldg., Binghamton, procurement officer, W.P.A., will purchase materials.

N. Y., Colonie — Village improving Cohoes-Crescent Bridge Hy., relief labor. $55,694. **W.P.A.** J. W. Carroll, Old Post Office Bldg., Albany, procurement officer, W.P.A., will purchase materials.

N. Y., Greenburgh — Greenburgh Twp., repairing and guttering 400 ft. Washington Ave., in Manhattan Park from Old Tarrytown Rd.; macadam surfacing and rough stone curbs on north and south roads of Parkways Gardens; improving, excavating, grading, telford base, macadam surfacing, stone curbs on 1,150 ft. Parkways Gardens, relief labor. $40,000. **W.P.A.** D. Jordan, High School, Main St., White Plains, procurement officer, W.P.A., will purchase materials.

N. Y., Hamburg—Village, Village Hall, repairing, surfacing, guttering, etc., 12.2 mi. streets in Highland Acres Subdivision, Quimby Dr., Sprague, Lake View, Linewood and Rosedale Aves., Hickok, Schutz, Kellerman, Mile Strip, Parker, Sheldon, Bay View Sts., relief labor. $80,000. **W.P.A.** H. F. Burd, 1014 City Hall, Buffalo, procurement officer W.P.A., will purchase materials.

N. Y., Malone—City, repairing, paving, guttering 1.9 mi. Sam Bloomer Rd.; 1.1 mi. McMahon Rd. and 2.6 mi. Gonyea Rd., relief labor. $40,000. **W.P.A.** J. F. Leeds, South St. School, Glens Falls, procurement officer W.P.A., will purchase materials.

N. Y., Marilla—Marilla Twp., repairing, surfacing, guttering 1 mi. Bullis Rd., 1 mi. Third Rd., 1 mi. Coleman Rd. and 0.5 mi. Baer St., relief labor. $25,000. **W.P.A.** H. F. Burd, 1014 City Hall, Buffalo, procurement officer W.P.A., will purchase materials.

N. Y., Sodus — Village, repairing, guttering sections of Steel Point, Roman, Richards, Barkley Hill, Cleve Miller, Robinson, Beam Hill, and Centenary Rds., relief labor. $23,000. **W.P.A.** J. E. Williamson, Federal Bldg., Elmira, W.P.A. procurement officer, will purchase materials.

N. Y., Windham—Village, clearing, excavating, drainage, ditches and removing dangerous curves for 4 mi. and constructing 2 mi. field-stone base on Norvoo Rd., relief labor. $25,000. **W.P.A.** J. W. Carroll, Old Post Office Bldg., Albany, procurement officer, W.P.A., will purchase materials.

★ **Ohio**—J. Jaster, Jr., dir. Hys., Columbus, grading, paving 3.452 mi. Clark Co., to DeSalvo Constr. Co., 4011 Erie Ave., Cincinnati, $119,403***1.259 mi. Ashland Co., to R. Myers, Campbellsburg, Ind., $136,202***hot laid asphaltic concrete resurfacing 0.779 mi. Hamilton Co., to Scully Bros., 805 Atlas Bank Bldg., Cincinnati, $48,510***concrete paving 3.036 mi, Licking Co., to R. J. Dienst, 297 South High St., Columbus, $438,604***grading, roadside improvement 0.16 mi. Miami Co., to L. D. Near, Forest, $15,785***grading, drainage structures 1.211 mi. Montgomery Co., to Finke Eng. Co., 116 South Perry St., Dayton, $7,443***grading, traffic bound paving 0.505 mi. Stark Co., to H. H. Wise, 1126 11th St. N. W., Canton, $5,613***grading, drainage structures, stabilized base paving, and constructing concrete bridge over Norfolk and Western R.R., Clermont Co., to M. F. Quill & Sons, 506 East 13th St., Cincinnati, $57,758***grading, drainage structures, hot laid asphaltic concrete paving 1.826 mi. Clinton Co., to Andrews Asphalt Paving Co., 808 1st Natl. Bank Bldg., Hamilton, $107,229***grading, draining, widening, resurfacing 1.778 mi. Erie Co., to Thompson Paving & Constr. Co., 4232 North Haven Ave., Toledo, $138,633***grading, concrete paving 1.651 mi. Knox Co., Proposal 1, paving, constructing concrete bridge with steel beams, on extended abutments over Dry Creek, 5.067 mi. same road, Proposal 2, rein.-con. paving, roadside improvement 0.05 mi. same road, Proposal 3, to S. Monroe & Sons Co., 2640 Gallia St., Portsmouth, $267,028***grading, drainage structures, concrete paving 0.184 mi. and constructing concrete beam bridge over Arcole Creek, Lake Co., to Koski Constr. Co., 4624 State Road, Ashtabula, $32,563***grading, drainage structures, concrete paving approaches to viaduct over Black River, 0.262 mi. Lorain Co., Proposal 1, constructing deck plate viaduct on steel bents and tower over Black River, same road, Proposal 2, to Holmes Constr. Co., Wooster, $288,659***grading, drainage structures, widening, concrete resurfacing 1.637 mi. Mercer Co., Proposal 1, grading, constructing concrete bridge with steel beams over Beaver Creek, 4 mi. west of Celina, 3.092 mi. same road, Proposal 2, and grading, drainage structures, concrete widening and paving 6.249 mi. Morrow Co., to Hinton & Smalley, Celina, $146,436 and $259,070 respectively***grading, paving 1.036 mi. Paulding Co., Proposal 1, 0.096 mi. same road, Proposal 3, constructing concrete bridge 0.022 mi. same road, Proposal 2, to J. H. Blausey & Co., 106 College St., Woodville, $113,470*** grading, drainage structures, brick on concrete paving 4.384 mi. Portage Co., Proposal 1, constructing concrete bridge with steel beams 0.019 mi. same road, Proposal 2, to Hollinger Davidson Co., 85 East Thornton St., Akron, $415,890***grading, drainage structures, concrete paving 0.578 mi. road and constructing grade crossing elimination with Pennsylvania R.R. Co., Richland Co., Proposal 1, grading, draining, concrete paving 0.228 mi. same road Proposal 2, to Mansfield Asphalt Paving Co., Rear 31 Orange St., Mansfield, $83,144. Grand total $2,765,917. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

Oklahoma—State Hy. Dpt., Oklahoma City, grading, draining 1.465 mi. road in Oklahoma Co., to Mid-West Materials Co., Key Bldg., Oklahoma City, $23,217 est. $25,148***5.09 mi. Noble Co., to J. J. Thompson, 434 Northwest 35th St., Oklahoma City, $31,773 est. $32,901***6.251 mi. Beckham Co., to R. P. Tway, 710 East 19th St., Oklahoma City, $31,690 est. $32,645***2.296 mi. Love Co., to Highway Constr. Co., Daniels Bldg., Tulsa, $23,822 est. $25,000***6.518 mi. Pottawatomie Co., to Brooks & Dallgreen, Insurance Bldg., Oklahoma City, $43,283 est. $45,417***5.194 mi. Woodward Co., to Ellis & Lewis, Muskogee, $41,566 est. $46,520***5.627 mi. Comanche Co., to Wetzel & Stewart, Ramsy Tower Bldg., Oklahoma City, $31,893 est. $38,747. Grand total $227,244.

Oregon—State Hy. Comn., Portland, broken stone paving road in Coos Co., to Umqua River Navigation Co., Gardner, $29,590***grading, crushed rock surfacing 3.6 mi. Lincoln Co., to Saxton, Looney & Riley, Bway. Bldg., Portland, $25,352***oiling 4 mi. Warsaw Co., to Warren Northwest, Inc., Portland, $6,871***bituminous surfacing 3.06 mi. Multnomah Co., and 4.93 mi. in Klamath Co., to H. Blake, 400 North Thompson St., Portland, $41,606 and $124,640 respectively***bridge in Wheeler Co., to T. Lillbo, Reedsport, $5,714. Grand total $223,773. Bids Mar. 12. Rejected bids Mar. 12, improving roads in Columbia and Lane Counties. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Pennsylvania—State Hy. Dpt., Harrisburg, rein.-con. paving, rein.-con. and plate girder bridge 0.43 mi. Route 238, Sect. 6, Pymatuning Twp., Mercer Co., to County Constr. Co., 916 Forbes St., Pittsburgh, $111,367. Bids Jan. 13. Bids Jan. 31. Noted Feb. 6, C.D.—Jan. 23, E.N.-R.

Pa., Johnstown—City, bituminous resurfacing 38,012 sq.yd. of 12 streets, new curbs, sidewalks in Osborn St., temporary bituminous repairs 2,500 sq.yd. various streets, day labor, under supervision of H. Lee Wilson, city engr., and J. W. Trimble, supt. Hys. Est. $83,684. **Maturity in April.**

Rhode Island—State, Providence Plantations & Div. of Contracts, Standards & Purchases, State House, Providence, sheet asphalt, Class J on concrete paving 0.16 mi. Project W.P.M.S. 97, Contr. 3514, C Central Falls, to M. A. Gammino Constr. Co., 728 Valley St., Providence, $8,356. Bids Jan. 27, awarded Mar. 12. Noted Feb. 3, C. D.—Jan. 23, E. N.-R.

★ **South Dakota**—State Hy. Comn., Pierre, to E. Gustafson, Sioux Falls, grading 0.495 mi. Deuel Co., $11,593; 0.568 mi. Corson Co., $21,318; 1.667 mi. Corson Co., $13,504; 0.466 mi. Corson Co., $18,157; 0.419 mi. Corson Co., $7,491***to Jarvis, Wright & Howell, Sioux Falls, 0.568 mi. Brookings Co., $9,737; 4.024 mi. Arlington Co., $59,713***to England & England, Murdo, 5.039 mi. Chamberlain Co., $45,278***to D. Gustafson, Sioux Falls, 4.442 mi. Sanborn Co., $26,261***to S. E. Gustafson, Beresford, 19.8 mi. Union Co., $61,691***to England Constr. Co., 3807 Leavenworth St., Omaha, Neb., 5.166 mi. Meade Co., $29,716; 12.379 mi. Pringle Co., $9,681***to Strong & Waggoner, Mitchell, 4.014 mi. Potter Co., $10,580; 6.004 mi. Potter Co., $23,409; 4.098 mi. Sully Co., $19,378***to O. E. Miller, Bismarck, N. D., 6.043 mi. Ziebach Co., $41,391***to Hector Constr. Co., Hector, Minn., graveling 22,688 mi. Stanley Co., $44,494; 7.008 mi. Aurora Co., $6,989***to Mobridge Constr. Co., Mobridge, 6.233 mi. Day Co., $5,932; 10.109 mi. Day Co., $9,111; 4.453 mi. Walworth Co., $1,286***to W. E. Bartholow & Son Constr. Co., Huron, 9.155 mi. Faulk Co., $11,954***to J. L. Healy Constr. Co., Sioux Falls, 9.861 mi. Brown Co., $15,227***to W. R. Rindekugal, Spencer, 1.921 mi. Union Co., $1,831***to S. S. Roberts, Rapid City, resurfacing 7.038 mi. Lawrence and Meade Counties, $5,117; 11.182 mi. Lawrence Co., $9,387***to Joyce & Co., Kansas City, Mo., 10.936 mi. road in Lawrence Co., $7,291; 10.824 mi. Butte and Lawrence Counties, $8,661***to N. O. Monsrud, Sioux Falls, roadside improvement 8.59 mi. Hanson Co., $4,696***to Taylor Nurseries, Ipswich, 0.944 mi. Brown Co., $1,283; 0.42 mi. Brown Co., $1,212. Grand total $543,369. Bids Mar. 10. Noted Mar. 4, C. D.—Mar. 12, E. N.-R.

Texas—G. Gilchrist, state hy. engr., Austin, roadside improvement, involving grading and plating 5.44 mi. State Hy. 43, WPH 453 E and WPH 834-A, Anderson Co., to E. Field, Calvert, $6,616 est. $7,000. New **P.W.A.** Bids Feb 25. Noted Mar. 3, C. D.

†*Federal Government.*

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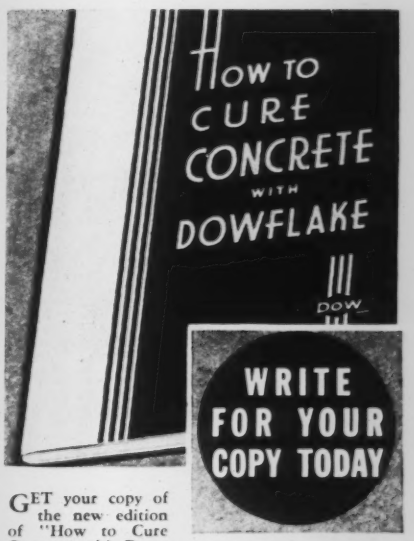

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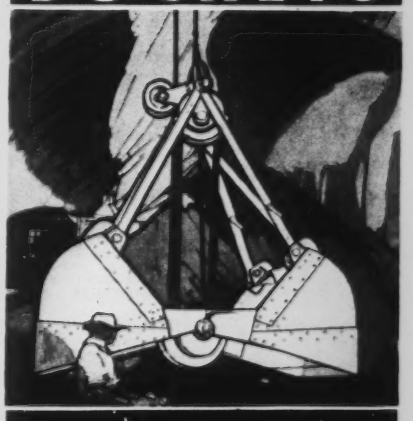

Capacities: ½ to 15 Yards for All Kinds of Light or Heavy-duty Service.

INDUSTRIAL BROWNHOIST
BAY CITY, MICHIGAN
New York, Philadelphia, Cleveland, Chicago
Agents in principal cities

Streets and Roads (Continued)

Utah, Salt Lake—Salt Lake Co., G. M. Haley, surv., improving 1.5 mi. Mill Creek Canyon Rd. and 6.5 mi. 128th, South Sts. from Lark to Redwood Rds., Salt Lake Co., relief labor. $27,819 and $29,700 respectively.

★**Virginia**—State Hy. Dpt., Richmond, road improvement Wythe Co., to Rosenbaum Bros., Inc., Pocahontas, $35,870***Southampton Co., to W. H. Scott, Franklin, $1,294***Caroline Co. to W. H. Armstrong & Co., 2700 2nd St. N.W., Wash., D. C., $44,770***Arlington and Warrenton Counties, to Blackwell Eng. & Constr. Co., Warrenton, $89,602 and $3,621 respectively***Shenandoah and Warren Counties, to Clark & Lewis, Luray, $2,280 and $3,585 respectively***Williamsburg Co., to R. K. Williams, Richmond, $5,323***Floyd Co., to W. W. Tuck & Son, Virgilina, $153,472*** Smyth Co., to W. N. Jackson, Meadowview, $59,907***Charles City Co., to F. J. Gannaway, Norfolk, $19,227***Pulaski Co., to M. S. Hudgins & McDowall & Wood, Roanoke, $112,005 ***Roanoke Co., to C. L. Tinsley, Roanoke, $26,333***Martinsville City, to Alley Constr. Co., Bristol, $8,146***Henrico Co., to T. A. Loving & Co., Goldsboro, N. C., $38,144*** Falls Church Co., to Northern Virginia Constr. Co., Alexandria, $3,745. Grand total $607,324. Bids Mar. 17. Rejected bids Mar. 17, road improvement 4.5 mi. Project 510-A1B2, Culpeper Co. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

EARTHWORK, IRRIGATION, DRAINAGE AND WATERWAYS

PROPOSED WORK

★**Calif., Los Angeles**—Los Angeles Co. Flood Control Dist., C. H. H. Howell, engr., 205 South Broadway, a bill providing for a survey of conditions in flood control areas of the Los Angeles River, San Gabriel River and Rio Hondo Basins was signed Mar. 9, by President Roosevelt. The survey to be made by U. S. Army Engineers will pave the way for the expenditure of $25,000,000 in the near future for construction of such dams, debris basins and channels as are required in the local watershed for adequate flood protection.

★**†Calif., San Francisco**—U. S. Eng., Custom House, received no bids Mar. 10 for placing dredge fill and constructing rock retaining wall, on 385 acre site of tidelands, north of Yerba Buena Island, in San Francisco Bay, as prospective general contractors declared inability to obtain performance bonds from sub-contractors, supplying the necessary rock for fill. $3,043,120. P.W.A. allotment. Noted Feb. 25. C. D.—Feb. 27, E. N.-R.

Colo., Pueblo—E. W. Corn, Works Progress Administrator, City Hall, plans new channel banks and deepening channel of Fountain River, through and above Pueblo, building 2 mi. railroad track, narrow gage. Railroad equipment to be furnished by Platt Rogers, Inc., Pueblo. Total est. $350,000.

†Mass., Boston—U. S. Eng., Custom House, Boston, making surveys widening, deepening channel of Chelsea Creek from 150 to 200 ft. wide and 25 to 30 ft. deep. To exceed $14,000.

Mont., Choteau—Owner, c/o F. S. Wilson, surveys made and plans under way constructing dam at Quigley Coulee, for storing surplus spring waters from Sun River Canyon. A. W. Walker, Sun River engr.

N. J., Ocean City—H. Roeser, Jr., Mayor, and Council, plan new bulkhead along Bay Ave., part of street damaged by storm. $70,000. Engineer not appointed.

†New York — U. S. Eng., Whitehall Bldg., New York, approval of survey of 85 mi. Long Island Intracoastal Waterways from East Rockaway Inlet to Shinnecock Canal has been given by Major General E. M. Markham, ch. engr. U. S. Bd. River & Harbor Engineers. Civic leaders in Long Island region pointed out necessity of such a survey with a view toward improving and protecting local waterways. $10,000-$15,000 for survey.

B. C., Delta—Municipality making plans new drainage scheme, $50,000. Contingent to approval of B. C. Legislature, now being applied for.

BIDS ASKED

†Ala., Mobile—Apr. 2, by U. S. Eng., Mobile, dredging 2,230,000 cu.yd. in Mobile Bay Channel; adv. E. N.-R., Mar. 26.

†California—Apr. 2, by Bureau Reclamation, Old Post Office Bldg., Sacramento, excavating at Friant Dam site, Central Valley Project, northeast of Friant, incl. 200 cu.yd. all classes open-cut excav. at portals, drifting 300 lin.ft. holes, no drift larger than 700 lin.ft., additional drifting, no drift longer than 500 ft.

†Illinois—Apr. 15, by U. S. Eng., 932 U. S. Post Office Bldg., Canal and Van Buren Sts., Chicago, dredging 179,000 cu.yd. rock and 239,000 cu.yd. earth from Illinois River.

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†Illinois—Apr. 27, by U. S. Eng., 932 U. S. Post Office Bldg., Canal and Van Buren Sts., Chicago, maintenance dredging, incl. 326,000 cu.yd. earth in Alton, LaGrange and Peoria Pools, Illinois Waterway; adv. E. N.-R., Mar. 26.

Mo., Hannibal — Apr. 20, by Bd. Supervs. South River Drainage Dist., at office J. L. Plowman, atty., constructing complete drainage pumping station, incl. 3 Diesel engines, driven pumping units with accessories, suction and discharge piping and valves, brick pump house, machinery foundations, trash rack, rein.-con. forebay and discharge bay, about 3 mi. north of here.

★**†Mont., Fort Peck**—Apr. 20, by U. S. Eng., Postal Telegraph Bldg., Kansas City, Mo., placing 24 ft. 8 in. diam. and 1 in. steel plate inner liner, 7,350 tons steel, in Fort Peck Power Tunnel. $1,000,000.

†Nev., Boulder City — Apr. 11, by Bureau Reclamation, Denver, Colo., furnishing materials and constructing rubber tile floor covering for Boulder Canyon Project, 7 mi. northeast of here.

Pa., Sellersville—See "Contracts Awarded."

†Washington—Apr. 13, by Bureau Reclamation, Yakima, constructing earthwork, canal lining and structures on Yakima Ridge Canal, Roza Div., Yakima Project, incl. 746,500 cu.yd. excav. for canal, 9,400 cu.yd. excav. for structures, Spec. 675. J. C. Page, acting comr.

CONTRACTS AWARDED

Calif., Los Angeles—See "Unclassified."

Calif., Oakland — City Port Comn., 40,000 cu.yd. clamshell dredging at Livingston and Dennison Street Pier, to American Dredging Co., 255 California St., San Francisco, 35c. per cu.yd. Bids Mar. 7, awarded Mar. 11. Noted Mar. 13, C. D.

†Louisiana—U. S. Eng., New Orleans, constructing 500,000 cu.yd. earthwork in Slocum Levee, Red River, to McWilliams Corp., Montelcone Hotel, New Orleans, $42,200. Bids Feb. 27. Noted Mar. 4, C. D.—Feb. 20, E. N.-R.

Pa., Sellersville—City, Sellersville Park Comn., D. D. Cressman, pres., constructing dam on east branch of Perkiomen Creek and development of municipal park; dam will widen creek to 70 ft. and provide lake 1 mi. long. Plans provide for concrete dam, 20 ft. wide at bottom and tapering to 2 ft. at top; playground to be developed on site will include park, athletic field, various buildings, etc., day labor. $68,000. **Maturity at once.** Owner purchases materials.

Tex., Beaumont—Jefferson Co., c/o Comrs. Court, constructing Salt Bayou Spillway on Intracoastal Canal, near here, earth embankment, bulkheads, to Crittenden Bros. Towing Co., Port Arthur, $15,200 for general contract.

B. C., Steveston—Dpt. P. Wks., Ottawa, Ont., constructing Albion Island and Woodwards Dikes, Albion Island Dike 2, and Woodwards Training Wall extension Fraser River, to Fraser River Pile Driving Co. Ltd., New Westminster, $42,541. Noted Feb. 26, C. D.—Mar. 5, E. N.-R.

UNCLASSIFIED

CONTRACTS AWARDED

Calif., Berkeley — SWIMMING POOL — City plans by J. W. Plachek, Mercantile Bank Bldg., 75x250 ft., rein.-con. swimming pool with filtration and chlorinating plant, grandstand, dressing rooms, etc. $175,000. W.P.A. approved project.

Calif., Daly City — SWIMMING POOL and GYMNASIUM—Jefferson Union High School Dist. plans by Resing & McGuinness, 488 Pine St., San Francisco, 1 story, rein.-con., steel, 40x75 ft. swimming pool and gymnasium, $150,000. P.W.A. grant $69,000. District recently voted $85,000 bonds. Noted July 15, C. D.—July 18, E. N.-R.

Calif., San Luis Obispo—OIL PIPE LINE—Sumner C. Bryant, member of the general counsel of the Texas Co., 929 South Broadway, Los Angeles, has been loaned to a new organization now being incorporated to construct a new oil pipe line from Kettlemen Hills to Estero Point, north of Morro Bay. To exceed $23,000.

Calif., Springville—SWIMMING POOL—Tulare-Kings Counties Joint Tubercular Hospital, plans by E. J. Kump, Rowell Bldg., Fresno, rein.-con. swimming pool. $45,000. Noted Feb. 26, C.D.—Mar. 5, E.N.-R.

Calif., Upland — PARK — City plans by S. Spaulding, 9441 Wilshire Blvd., and R. Cornell, landscape artist, 3723 Wilshire Blvd., both Beverly Hills, park development on 47 acre tract, incl. recreation building, swimming pool, out-door theater, park house and landscaping. $150,000.

Conn., Hartford — ARENA — M. Podoloff, Grove and Orange St., New Haven, sketches by D. Podoloff, Orange and Grove Sts., New Haven, 200x320 ft. arena, 75x200 ft. refrigerated surface for hockey, etc. To exceed $110,000. Nathan Podoloff, Orange and Grove Sts., New Haven, engr.

Idaho, Boise—SWIMMING POOL—City Council plans municipal swimming pool. $45,000. C. C. Stevenson, Boise, engr.

Ind., Marion—FIRE ALARM SYSTEM—City remodeling and enlarging fire alarm system, constructing small building for headquarters for new central equipment. $25,000. **Maturity this spring.**

Ind., Muncie — MAUSOLEUM — Beech Grove Cemetery Assn., Muncie, plans mausoleum, with chapel, Indiana limestone, near White River. $60,000. P. Carmichel, engr.

Md., Baltimore—TOWER—Property Management, Inc., 215 North Calvert St., making plans 200 ft. steel tower for broadcasting, at Arlington and Portage Aves. Private plans.

Mass., New Bedford—PIER EXTENSION—City, G. O. Gardner, supt. P. Buildings, plans extension and repairs to pile, timber, City Pier 4. $54,000. G. H. Nye, city engr.

Mass., Revere — STADIUM — City, J. M. O'Brien, City Hall, plans by P. J. Brown, 51 Cornhill, Boston, stadium in Paul Revere Park. $75,000.

★**Michigan**—LIGHT and POWER SYSTEM IMPROVEMENTS—Detroit Edison Co., 2000 2nd Blvd., Detroit, plans additions, improvements and betterments to overhead and underground lines, incl. such work in connection with public improvements, such as road, grade separations, street widening, etc., alternating current network to provide A.C. service in portions of district now served by direct current, Detroit and vicinity, $1,000,000; 36 in. pipe line from neighboring steel plant to Delray power plant of Detroit Edison Co., for transmission of blast furnace gas to be burned in boilers at Delray power plant, length approximately ½ mi. Detroit; electric meters and line transformers to provide for service to new customers and increased consumption of old ones, incl. 500 mi. of farm lines to bring electric service to farmers in older territory serviced by the company; large number of outdoor meter boxes to replace present indoor meters, Detroit and vicinity, $2,000,000; 350 mi. farm lines in Lake Huron Division, also rebuilding some of existing distribution lines recently acquired by company, Thumb District of Michigan $500,000; brick, steel, rein.-con. substation installations and additions, incl. principal item at Ecorse. $200,000; 1 story, basement, brick, steel, stone, rein.-con. residential type substation to replace present temporary steel building known as Hoover Substation, Ann Arbor, $90,000. Total exceeds $3,790,000. Part of $9,000,000 budget for 1936.

Missouri—RAILWAY—Wabash R.R. Co., E. L. Crugar, ch. engr., Railway Exch. Bldg., N. B. Pitcairn and F. C. Nicodemus, Jr., receivers, authorized by Judge C. B. Dow to expend $276,297 for improving right-of-way, incl. replacing 68, 70, 75 and 80 lb. steel rails with 90 lb. steel rails at various points, straightening embankment between Brunswick and North Kansas City, $8,052; and bridge over Nishnabatena River, near Shenandoah, Ia., $10,648.

Mont., Billings — HANGAR — City, O. W. Bickey, clk., constructing 100x128 ft. hangar, 30x128 ft. municipal machine shop. Election Apr. 6 for $50,000 bond issue. R. T. Hurdle, city engr.

Mont., Wibaux—RURAL ELECTRIFICATION—Northwest Rural Electrification Co., Wibaux (subsidiary of Montana-Dakota Power Co.), plans constructing 115 mi. lines in western North Dakota and Montana. $146,000 allocated.

Neb., Lincoln — RURAL ELECTRICAL LINES—Iowa-Nebraska Power Co., Lincoln, plans constructing 200 mi. rural electric lines. Applied to State Railway Comn. for authority to construct.

New Jersey — PIPE LINE — **Middlesex** Pipe Line Co., c/o Sun Oil Co., 1608 Walnut St., Phila., Pa., plans gasoline pipe line from Newark to Oak Tree. To exceed $40,000.

N. J., Lake Hiawatha—TRACT DEVELOPMENT—Troy Hills, Inc., c/o M. Klein, pres., plans additional tract development and group of cabins. $140,000.

N. Y., Brooklyn—COAL POCKETS—Burns Bros. Coal Co., G. Pattison, in charge, 500 5th Ave. plans by Nicholson Co., 405 Lexington Ave., New York, constructing 1 story, concrete coal pockets, 149 6th St. $37,000.

N. Y., Cortland—SWIMMING POOL—City, City Hall, made plans constructing 75x200 ft., rein.-con. swimming pool. A. R. Rielly, city engr.

N. Y., Elmhurst—SPORTS and FIELD HOUSE—Bd Educ., 500 Park Ave., New York, soon takes bids general contracts, sport and field house, 56th Ave., 90th and 92nd Sts. $50,000. W. C. Martin, Flatbush Ave. extension and Concord St., Brooklyn, archt. and supt. School Buildings.

★**N. Y., Utica** — PARKS — City, City Hall, plans improving parks and recreational grounds, incl. new sidewalks, roads, building 4

†*Federal Government.*

Unclassified (Continued)

swimming pools, wading pools, fireplaces, etc. $1,000,000. J. B. Shaw, city engr.

N. Y., **Wellsville**—NATURAL GAS DEVELOPMENT—Wyoga Gas & Oil Corp., 308 First Nat'l. Bank Bldg., Williamsport, Pa., plans developing new natural gas area in Willing Twp., Allegany Co., incl. drilling several 4,400 and 4,600 ft. wells, each requiring from 3,000 to 4,000 ft. 6¼ in. pipe, connections, valves, equipment, etc. $50,000 or more. H. Fulton, Coudersport, Pa., engr.

O., **Bergholz**—COAL TIPPLE, etc.—Louise Coal Co. plans coal tipple loading and handling plant. To exceed $40,000. **Maturity indefinite.** Architect not appointed.

O., **Dayton**—SWIMMING POOL—City, E. V. Stoecklein Welfare, dir., making plans 2 story, 52x128½ ft. concrete building to house indoor swimming pool and recreation rooms, at Bamberger Park, 5th and High Sts. $86,500. W. J. Kuh, City Plan Board, archt.

O., **Sebring**—COAL HANDLING and TIPPLE—Sebring Coal Co. plans coal handling and tippel. $37,000.

Pa., **Allentown** — PARK — City acquired 80 acre tract of land in Lehigh Mts., near 19th ward and plans development of municipal park, incl. administration building, constructing highway from South 10th St., installing water-mains adn light lines, picnic grounds, footpaths, etc. To exceed $23,000. **Maturity in summer.** W. R. Schnabel, City Hall, supt. and engr.

Pa., **Meadville**—AIRPORT—City, City Bldg., R. L. Phillips, city engr., plans development of municipal airport. $173,844. Project approved by Federal Air Commerce Bureau. Will probably be W.P.A. project. **Maturity soon.**

Pa., **Johnstown** — AIRPORT — City, D. J. Shields, mayor, plans developing municipal airport, incl. grading, runways, hangars, administration building, lighting system, etc. $170,000. D. R. Schnabel, dir. Parks & Public Property, City Hall, in charge. H. Lee Wilson, city engr.

Pa., **Sharon**—CEMETERY DEVELOPMENT—Hillcrest Memorial Park Corp., C. H. Sokel, chn., Sharon, plans by E. S. Hanna, archt., 126 State St.; A. R. Hanny, 1816 Wilson Ave., and Griff Nichols, engrs., Sharon, cemetery development, incl. draining, fencing, administration building, chapel, vault, fountain rest room. $225,000. Approximately 13,000 cu.yd. grading awarded to Lunn Bros., Sharon.

Pa., **Warren**—GAS DEVELOPMENT—Hanley & Bird, 48 Kennedy St., Bradford, plans development of potential natural gas area in Mead Twp., Warren Co., incl. drilling 1 or more 4,500 ft. wells, earh requiring 3,200 to 3,600 ft. 6¼ in. pipe and connections. $40,000 or more. F. E. Eckert, c/o owner, engr.

R. I., **Burrillville**—UNDERGROUND CONDUIT STEAM and ELECTRICAL CONNECTIONS—See "Public Buildings."

R. I., **Howard** (Cranston)—UNDERGROUND CONDUIT STEAM and ELECTRICAL CONNECTIONS—See "Public Buildings."

Texas—NATURAL GAS DISTRIBUTING SYSTEMS—Hidalgo Gas Co., c/o F. McCarthy, genl. mgr., Mission, plans natural gas distributing system, using 4-6 in. welded joint pipe, to be supplied gas from main line connected with Samfordyce fields to San Juan, $35,000; 16,000 lin.ft. 4- to 6-in. natural gas distributing system, McAllen, gas to be supplied from main line running through different towns, built from right-of-way, Mission, $30,000; natural gas distributing system at Weslaco, $45,000. Projects financed. Planning franchise, etc.

Texas—NATURAL GAS LINE—Hidalgo Gas Co., Mission, c/o F. McCarthy, genl. mgr., granted 20-year franchise by city of Mission, to construct natural gas system inside city limits of McAllen, probably use 35,000 ft. pipe. Company already has line running from Samfordyce fields to Mission and McAllen, to carry gas to 3 large irrigation systems, company will also construct another line from its nearest right-of-way to McAllen and other points adjoining. This line will supply gas for McAllen System. Est. $45,000 for main line and $60,000 for distributing system.

Wash., **Yakima** — PIPE LINE SYSTEM — Northwestern Natural Gas Co. plans pipe line system to Walla Walla and Yakima from 15 producing wells in Rattlesnake Hills area of Yakima Co., incl. 90 mi. pipe, later, statewide extension.

W. Va., **Powhatan**—COAL HANDLING and TIPPLE—Powhatan Coal & Coke Co. plans altering and repairing coal handling and tipple. $40,000. Architect not appointed.

B. C., **Ladysmith**—RAILWAY—Comox Logging & Railway Co., 355 Burrard St., Vancouver, making plans constructing 15 mi. logging railway (standard gage), from here to logging limits. Work will probably be done by owners. $100,000. Private plans.

N. B., **Woodstock**—POWER DEVELOPMENT—Bd. Trade, G. C. Campbell, pres., sponsoring plans power development on Gee River, possibly 1,000 hp.

N. S., **Parrsboro**—AERODROME—Dominion Govt. purchased 100 acre site at Westbrooke for aerodrome. **Maturity in summer.**

Ontario—RAILWAY—Michigan Central Ry., Detroit, Mich., and Talbot St., St. Thomas, plans laying 30 mi. new 127 lb. rails on Canadian Southern division, also new ties and ballasting from Windsor to Niagara Falls.

Alaska, Anchorage — TRANSMISSION LINE—City plans constructing transmission line. $150,000. P.W.A. approval awaited.

BIDS ASKED

Calif., Los Angeles—AIRPORT—See "Contracts Awarded."

Maine — AIRPORT IMPROVEMENTS — See "Contracts Awarded."

Mass., Bridgewater—ATHLETIC FIELD—See "Contracts Awarded."

†**Mass., Hull**—BOATHOUSE, etc.—Apr. 2, by U. S. Coast Guard, Custom House, Boston, constructing 1 story, 44x58 ft. concrete boathouse, on concrete piers, 160 ft. timber launchway, demolishing existing boathouse and launchway, at Point Allerton Coast Guard Station. $12,000.

Mass., Westfield and Holyoke—AIRPORT—See "Contracts Awarded."

N. Y., **Delhi** — PARK — See "Contracts Awarded."

N. Y., **Yonkers** — PARKS — See "Contracts Awarded."

†**O., Gallipolis**—CORES, etc.—Apr. 8, by U. S. Eng., Huntington, W. Va., removing 50 lin. ft. 6 in. diam. cores from Gallipolis lock walls and finishing thirty-five 12 in. test specimens from cores.

Pa., **Ridgeway** — RETAINING WALL — See "Contracts Awarded."

Vt., Bennington—AIRPORT IMPROVEMENTS—See "Contracts Awarded."

Wash., Vancouver—MARINE TERMINAL—Apr. 2, by Port Comn., constructing 191x810 ft. pier with 120x740 ft. warehouse. $316,000. J. S. Metcalf & Co., 105 West Adams St., Chicago, engrs. Noted Feb. 3, C. D.—Feb. 6, E. N.-R.

CONTRACTS AWARDED

Calif., Antioch — SWIMMING POOL — H. Scism, 1503 D St., 35x77 ft., rein.-con. swimming pool with pressure filter, to F. Stamm, 501 "B" St., fixed fee basis. J. Narbett, 462 31st St., Richmond, archt.

★ **Calif., Los Angeles** — AIRPORT — City, L. Aldrich, city engr., City Hall, constructing 35x175 ft. seaplane ramp, concrete shore platform, dredging mooring basin for seaplanes, 6 ft. deep at low water, raising, extending rock jetty, constructing asphaltic concrete runways, two 400x2,000 ft. each, installing watermains, fire hydrants, fences, roads and other improvements. W.P.A. labor. Est. $538,000.

Calif., Los Angeles—LINE CHANGE and CURVE REDUCTION—Santa Fe Railway, 560 South Main St., line change and curve reduction at 15 locations between Chino and Haviland involving 34,000 cu.yd. earth and 129,000 cu.yd. rock excav., 160,000 cu.yd. embankment, to Sharp & Fellows Contg. Co., Central Bldg. Awarded Mar. 12.

Calif., Oakland—TRANSIT SHED—City Port Comn., structural steel frame only for extension to Transit Shed 2, 270 ft. long, etc., to Herrick Iron Wks., 1729 Campbell St., $15,240. Bids Mar. 2, awarded Mar. 11. Noted Mar. 13, C. D.

†**Calif., San Francisco**—BOAT LANDING—P. Wks. Officer, 12th Naval Dist., 100 Harrison St., furnishing and driving four 60 ft. creosoted piles for small boat landing at Naval Receiving Station, Yerba Buena Island, San Francisco Bay, to Healy-Tibbits Constr. Co., 64 Pine St., $358. Noted Mar. 16, C.D.

†**Calif., San Francisco**—TELEPHONE CONDUIT—Con. Q.M., installing telephone conduit and manholes at Fort Winfield Scott and Crissy Field, from W. A. Degen, 2055 Santa Clara Ave., Alameda, $1,482.

La., Lake Charles—LOADING DOCKS—Continental Oil Co., Lake Charles and 60 East 42nd St., New York, constructing loading docks, wharf will be 560x260x120 ft., treated timbers, rein.-con. construction, to Doullut & Ewin, Q. & C. Bldg., New Orleans, $120,000. Noted Jan. 9, C. D.—Jan. 16, E. N.-R., under "Industrial Buildings."

Maine—AIRPORT IMPROVEMENTS—Towns or Cities as noted and U. S. of A. Dpt. of Commerce, Airways Division, H. F. Law, division administrator, 424 Park Sq. Bldg., Boston, Mass., have started work on following airport projects under W.P.A., city of Augusta, constructing radio range station, lighting equipment and enlarging runways, $86,000***city of Portland, constructing radio range station, new 3,500 ft. gravel runway, resurface runways, construct hangar, move present hangar, con-

Federal Government.

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Ransome

BUILDING MIXERS

capacities from 3½ cu. ft. to 5 cu. yds.

•

Paving Mixers

•

Pneumatic Placers

•

Pneumatic Grouters

•

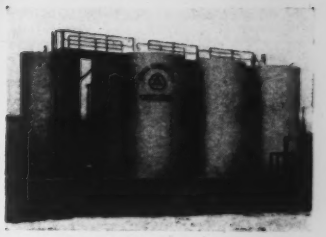
Tower & Chuting Plants

Ransome Concrete Machinery Company

Dunellen, New Jersey

Cable Address "Racomaco-Dunellen"

OIL AND GASOLINE TANKS



All welded, bulk storage and filling station tanks—built by experienced workmen—full weight material—one piece dished heads—wide rings, one plate to each ring—assembled by shielded arc welding method—the result an ALL WELDED TANK, virtually a ONE PIECE TANK—PDM gives you the best tanks at a competitive price.

Pittsburgh DES MOINES STEEL COMPANY

3414 Neville Island, Pittsburgh

915 Tuttle St., Des Moines

Unclassified (Continued)

struct waiting room, $207,000***town of Biddeford, resurfacing and widening present runways, $48,000, relief labor. Grand total $341,000. Materials to be purchased by U. S. Treas. Dpt. Procurement Division, K. P. Foster, Procurement Officer, 448 Park Sq. Bldg., Boston, Mass.

Mass., Andover — PARK MAINTENANCE — See "Streets and Roads."

Mass., Bridgewater — ATHLETIC FIELD — Commonwealth of Massachusetts, Dpt. Educ., State House, Boston, constructing athletic field at State College, incl. grading, landscaping and drainage. Day labor, under **W.P.A.** $26,500 appropriated. Noted Oct. 20, 1933. C. D.—Oct. 26, 1933. E. N.-R.

Mass., Westfield and Holyoke—AIRPORT—City of Westfield, R. H. Cowing, mayor, City Hall, and City of Holyoke, W. P. Yoerg, mayor, City Hall, enlarging and improving present airport, incl. fill and grading for longer runways, off Holyoke State Hy. Day labor. **W.P.A.** project. Est. $82,000.

★ **Michigan and Indiana**—GAS PIPE LINE—Columbia Gas & Electric Corp., 61 Broadway, New York, 44,000 tons of 22 in. steel gas pipe for 230 mi. gas pipe line for Detroit, Mich.-Zionsville, Ind., pipe line, to National Tube Co., Frick Bldg., Pittsburgh, Pa. $3,500,000. Noted Feb. 28, C. D.—Mar. 6, E. N.-R.

Mo., St. Louis — RADIO TRANSMITTING STATION—Thomas Patrick, Inc. (Radio Station KWK), Chase Hotel, Kingshighway and Lindell Blvd., 1 story, 54x61 ft., brick radio transmitting station, Logan St. and Riverview Ave., at Mississippi River front, to Schnur-Miller Constr. Co., 119 North 7th St. Est. $25,000. Bids Feb. 24, awarded Feb. 24. Noted Feb. 18, C. D.—Feb. 20, E. N.-R.

N. J., Audubon—STADIUM—Bd. Educ. constructing rein-con. stadium with wooden seats 3,000 capacity stand; local labor will be employed under Mr. Haaf materials purchased by W.P.A. $32,000. F. H. Rodey, 101 North 7th St., Camden, engr.

N. Y., Delhi—PARK—Village, constructing park, incl. dam for wading pool, foot bridges, picnic tables, benches, fireplaces, trails and parking places, own forces. To exceed $23,000. **W.P.A.** A. Calabriso, Telephone Bldg., Binghamton, procurement officer W.P.A., will purchase materials.

N. Y., New York—ADVERTISING TOWER—Corporation, c/o contractor, constructing advertising Tower 7th Ave. and 42nd St., to A. Campagna, 33 West 42nd St., New York, $60,000. Contractor awarding separate contracts. Schenley Products Co., 20 West 40th St., lessee. R. Candela, 578 Madison Ave., New York, archt.

N. Y., New York—BASEBALL PARK, etc.—Leopold Neckerman, Inc., general contractors, 205 East 42nd St., New York, 175 tons reinforcing steel for bleachers and baseball park alterations for Yankee Stadium, River Ave. and 157th St., to Concrete Steel Co., 2 Park Ave. Noted Mar. 4, C. D.—Mar. 12, E. N.-R.

N. Y., Yonkers—PARKS—City, City Hall, improving city parks, incl. constructing 3 concrete grandstands, sidewalks, fences, baseball diamonds, tennis courts, drinking fountains and miscellaneous repairs to buildings, playgrounds, roads, relief labor. $311,652. **W.P.A.** D. Jordon, High School, Main St., White Plains, procurement officer W.P.A., will purchase materials.

N. C., Asheville—TOURIST RESORT—E. G. Hester, Asheville, constructing 31 lodges and laundry in Homeland Park, tourist resort, to L. B. Jackson & Co., Asheville, $142,000.

O., Cleveland—SUBWAY—Great Lakes Exposition Co., Terminal Tower, constructing rein.-con. subway for underpass to exposition grounds, Lake Front, to Hadlock Krill Co., 3646 Euclid Ave. Est. $40,000. Noted Mar. 5, C. D.

★ **Pa., Ridgeway**—RETAINING WALL—Borough, constructing 936 ft. retaining wall, 18 in. high, along Front St., stone gutters in front of wall, drainage and inlets at strategic points and steps built into wall, day labor, under Borough Engineer. $446,598. **W.P.A.** C. E. Freeman, district W.P.A. administrator, DuBois.

Pa., Sellersville — PARK — See "Earthwork, Irrigation, Drainage and Waterways."

Pa., Sharon—CEMETERY DEVELOPMENT —See "Proposed Work."

Vt., Bennington—AIRPORT IMPROVEMENTS —Town and U. S. of A. Dpt. of Commerce Airways Division, H. F. Law, division administrator, 424 Park Sq. Bldg., Boston, Mass., grading, surfacing and fill at airport, relief labor, $25,000. **W.P.A.** Materials to be purchased by U. S. Treas. Dpt. Procurement Division, K. P. Foster, Procurement Officer, 448 Park Sq. Bldg., Boston, Mass. Work started.

★ **Ont., Ottawa**—TRACKAGE—Canadian National and Canadian Pacific Railways start work about May 1, on repairs to trackage, road beds, etc., relief labor, about 1,000 single men from relief camps. $3,000,000. Dominion Govt. to pay $1,500,000 and the railroads $750,000 each.

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Que., Rimouski—RAILROAD TRACK FOUNDATION—Secretary Dpt. P. Wks., Ottawa, Ont., reconstructing railroad track foundation, to Standard Constr. Co. Ltd., Quebec, $61,240. Est. $66,000. Noted Feb. 25, C. D.—Feb. 27, E. N.-R.

MATERIALS AND EQUIPMENT

PROPOSED WORK

TRACTOR, etc.—**Sacramento, Calif.**—H. G. Denton, city clk., plans purchasing tractor for Recreation Dpt., for use on golf course; one truck shovel, for Municipal Engineering Dpt.

TRASTOR—**Brunswick, Me.**—Town, L. A. Brown, chn. Bd. Selectmen, Town Hall, soon purchases 1 tractor for Hy. Dpt. Appropriation voted for same.

FIRE TRUCKS — **Acton, Mass.** — Town, Bd. Selectmen, H. Tuttle, clk., plans purchasing 2 new fire trucks, $8,000. Appropriation made.

TRUCK—**Andover, Mass.**—F. H. Hardy, chn. Bd. Selectmen, Town Hall, plans purchasing fire truck for Water Dpt. $1,200 funds appropriated.

HIGHWAY EQUIPMENT—**Franklin, Mass.**—Town, A. F. Granger, chn. Bd. Selectmen, Town Hall, plans purchasing highway department equipment. $3,500. Appropriation made.

PUMPING ENGINE—**Hudson, Mass.**—Town, H. M. Meserve, selectman, Town Hall, soon purchases 1 new pumping engine for Fire Dpt. $9,000. Appropriation made.

PUMPING ENGINE — **Marblehead, Mass.** — Town, W. H. Atkins, chn. of Fire Dpt., R. Tutt, town clk., Town Hall, soon purchases 1 new pumping engine. $10,500. Appropriation made.

GARBAGE TRUCK, etc.—**Methuen, Mass.**—Town, T. W. Gunter, chn. Bd. Selectmen, Town Hall, plans purchasing one garbage truck, $1,200; 2 trucks for Water Dpt., $1,400.

TRACTOR SNOW PLOW, etc.—**Royalston, Mass.**—Town, C. H. Brown, chn. Bd. Selectmen, soon purchases one tractor snow plow, $1,150, one fire truck chassis $900; fire hose $500, snow fence $100, new scales for public weighing $350. Appropriations made.

HOOK and LADDER—**Southbridge, Mass.**—Town, V. P. Tetroeault, chn. Bd. Selectmen, Town Hall, soon purchases one new hook and ladder for Fire Dpt., $6,000. Appropriation made.

SNOW REMOVAL EQUIPMENT—**Winchendon, Mass.**—Town, E. J. Dionne, chn. Bd. Selectmen, Town Hall, soon purchases snow removal equipment, $2,000. Appropriation made. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

POWER EQUIPMENT—**Michigan**—See "Unclassified."

TRUCK CHASSIS—**Minneapolis, Minn.**—City rejected bids Mar. 11, 1 truck chassis for Fire Dpt. Noted Mar. 5, C. D.

PUMPER—**Moorhead, Minn.**—City plans purchasing new pumper for Fire Dpt. R. G. Price, city clk. $10,000.

SNOW PLOW—**Sauk Center, Minn.**—City, J. F. Cooper, clk., plans purchasing 1 snow plow.

FIRE TRUCK—**Slayton, Minn.**—City, E. J. Gustafson, mayor, plans purchasing fire truck for Fire Dpt.

STORM SEWER PIPE—**Winona, Minn.**—City plans purchasing storm sewer pipe. $3,000. E. E. Chadwick, city engr.

STEEL TANKS—**St. Louis, Mo.**—Delbet Investment Co., 4331 North Florissant Ave., granted permit to install three 1,000 gal. underground steel tanks for gasoline for automotive service station, 4331 North Florissant Ave.

TANKS—**St. Louis, Mo.**—Industrial Oil Corp., 4501 Shaw Blvd., granted permit to install two 1,000 gal. underground steel tanks, for gasoline for automobile service station, 920 South Grand Blvd.

TRUCKS—**Dover, N. H.**—City, J. P. Keenan, mayor, City Hall, soon purchases 3 trucks for various city departments. Appropriation granted.

TANKS, etc.—**Elmhurst, N. Y.**—Sobol Bros., 110th St. and 5th Ave., New York, plans purchasing several 1,000 gal. underground gasoline tanks, pumps, etc. for 1 story, 30x60 ft. service station to be constructed at 61st St. and Woodhaven Blvd. Work by separate contracts. C. M. Spindler, c/o owner, archt.

FIRE TRUCK—**LeRoy, N. Y.**—Village, Chemical Hose Co., J. A. Miller, ch., bids in April, furnishing chemical motor fire truck. $4,500.

FIRE PUMPER—**Lindenhurst, N. Y.**—City voted to spend $6,000 for fire pumper.

TANKS, etc.—**New York, N. Y.**—Socony-Vacuum Oil Co., 26 Bway., plans purchasing several 1,000 gal. gasoline storage tanks, pumps, etc. for 1 story, 28x51 ft. brick, service station, to be constructed at Jerome and River Aves. Work probably by separate contracts. C. H. Schultz, c/o owner, archt.

★ TRUCKS, etc.—**New York, N. Y.**—City, F. H. LaGuardia, mayor, will ask Bd. Estimate for large appropriation to buy 1,000 new trucks, snow plows, and other vehicular equipment for Dpt. Sanitation, Municipal Bldg. About $7,500,000.

PAINT—**Niagara Falls, N. Y.**—E. Noonan, Bailey Bldg., Lockport, W.P.A. procurement officer, plans purchasing in near future quantity of paint to paint 12 schools, for City. City Hall To exceed $1,000.

STEEL TANKS — **Rochester, N. Y.** — A. J. Hocking, 805 Union Trust Bldg., representative Goodyear Wende Oil Corp., 76 Lansing St., Buffalo, will soon purchase 500 gal. or 1,000 gal. steel tanks for new service stations, at various locations. To exceed $1,000.

TRUCK—**Ontario, Ore.**—City Council rejected bids for new fire truck. Will readvertise.

FIRE TRUCK—**Allentown, Pa.**—City plans purchasing motor fire truck with pump and booster tank and other equipment for Fearless Fire Co. $5,000 or more. H. J. Weiler, dir. Dpt. Safety, City Hall, engr.

STEEL TANKS, etc.—**Allentown, Pa.**—Atlantic Refining Co., 260 South Broad St., plans installing 550 gal. steel tanks, electric pump and other equipment in gasoline service stations to be built at 13th and Tilghman Sts. To exceed $1,000. W. Samans, c/o owner, ch. engr. J. S. Parks, c/o owner, purch. agt.

★ AIR COMPRESSORS, etc.—**Bradford, Pa.**—Sloan & Zook Co., 101 Main St., in market for air compressors, pumping units, gas engines, electrical equipment and other equipment for $750,000 pressure plant project for recovery of crude oil in Venango Co. P. Tinkler, genl. supt. Noted Oct. 31 C. D.—Nov. 8, E. N.-R. under "Industrial Buildings."

FIRE TRUCK—**Roslyn, Wash.**—City plans purchasing new fire truck. $2,000. Matter under consideration by council.

DIESEL LIGHTING PLANT EQUIPMENT—**Ignace, Ont.** — Council plans equipping diesel operated lighting plant. $20,000-$25,000. J. Toit, clk. Interested in prices.

BIDS ASKED

REINFORCING STEEL, etc.—**Athens, Ala.**—Apr. 3, by City, A. P. Henderson, city engr., furnishing 37,000 lb. reinforcing steel, 1,062 bbl. Portland cement, 250 cu.yd. sand, 500 cu. yd. gravel stone or slag.

ROAD OIL—**Bakersfield, Calif.**—V. Van Riper, city clk., taking bids furnishing road oil for streets for period ending Dec. 31. To exceed $1,000.

ELECTRIC MOTORS—**Los Angeles, Calif.**—Apr. 16, by Metropolitan Water Dist. of Southern California, furnishing 15 electric motors to drive pumps of Colorado River Aqueduct, having combined hp. of 141,000. Each motor installation will be approximately 12 ft. high and be from 9 ft. to 14 ft. diam. Motor pumps will operate at 6,900 volts and 60 cycles. 6 motors for intake and Gene pumping plants of Aqueduct will be 9,000 hp. each, the three for Iron Mountain land will be 4,300 hp. each, and six for Eagle Mountain and Hayfield lifts will be 12,500 hp. each. F. E. Weymouth, genl. mgr. of Metropolitan Water Dist.

†HOPPER DREDGE—**San Francisco, Calif.**—Apr. 17 (extended date), by U. S. Eng., Custom House, San Francisco, constructing, delivering 1 steel twin screw dredge with Diesel engine. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

†FINE AGGREGATE SAND, etc.—**San Rafael, Calif.**—Apr. 3, by Con. Q.M., Fort Mason, San Francisco, 275 tons fine aggregate sand; 50 tons crushed stone or gravel; and alternate 50 tons crushed stone or gravel.

ASPHALTIC CONCRETE—**Torrance, Calif.**—Apr. 7, by City Clerk, furnishing, spreading 975 tons asphaltic concrete on Cabrillo Ave. from Carson St. to Pacific Electric Depot. $2,500. F. S. Leonard, City Hall, engr.

ROAD OIL, etc.—**Hartford, Conn.**—Apr. 7, by Bd. Contr. & Supply, at office of Mayor, furnishing during fiscal year ending Mar. 31, 1937, 100,000 gal. more or less of road oil with 45% to 55% asphaltic base; 100,000 gal. more or less tar to be used in surface treating of macadam streets, bidders will quote on about 60,000 gal. furnished and applied as directed and about 40,000 gal. delivered to city distributing wagons at bidders storage if within city limits, otherwise in tank cars, f.o.b. Hartford; adv. E. N.-R., Mar. 26.

†GENERATING PLANT—**New Haven, Conn.**—Mar. 31, by Procurement Officer, 1044 Chapel St., furnishing 2 Diesel electric generating plant.

TIMBER—**Florida**—Apr. 2, by State Road Dpt., Tallahassee, C. B. Treadway, chn., J. H. Dowling, state hy. engr., 54,042 MFBM untreated timber, long leaf yellow pine, 85% heart and 17,688 MFBM treated timber 16 lb. treatment, f.o.b. Palm, Project S-11, Rd. 23, Hillsborough Co.

†*Federal Government.*

Materials, etc. (Continued)

LIQUID CHLORINE, etc.—**Laporte, Ind.**—Apr. 6, by Bd. P. Wks., C. E. Anderson, clk., City Hall, 10,000 lb. liquid chlorine; 50,000 lb. aluminum sulphate, for Water Works Dpt.

CREOSOTED LUMBER, etc.—**Davenport, Ia.**—Apr. 1, by Scott Co., Davenport, 72,866 lin.ft. MB creosoted lumber; and 1,980 lin.ft. creosoted piling. J. M. Malloy, co. engr.

FIR LUMBER, etc.—**Waukon, Ia.**—Apr. 7, by Allamakee Co., J. H. Palmer, aud., 30,900 ft. B.M. Class A Douglas fir lumber, 1,700 gal. lubricating oil, 400 lb. No. 2 cup grease, 50,000 gal. gasoline, 25,000 lb. 40% dynamite, 5,000 ft. fuse, 5,000 electric caps, 3,000 fuse caps. H. Orr, co. engr.

†WIRE ROPE—**Eastport, Me.**—Mar. 31, by U. S. Eng., 2,000 ft. ¾ in. wire rope, high-grade plow steel, uncoated fibre core, right-hand twist, regular lay.

†HOIST—**Boston, Mass.**—Mar. 31, by U. S. Eng., Custom House, furnishing 1 double drum gasoline hoist with extension winch shaft mounted on structural steel bed frame, Circular 64.

CRAWLER TYPE TRACTOR, etc.—**Hallock, Minn.**—Apr. 6, by O. Myre, village clk., 1 new or used crawler-type tractor.

PORTABLE CULVERT MATERIAL—**Little Falls, Minn.**—Apr. 7, by L. J. Billstein, aud. Morrison Co., furnishing season's supply portable culvert material. J. E. Viner, co. hy. engr.

CULVERT MATERIAL, etc. — **Stillwater, Minn.**—Apr. 7, by R. F. Johnson, aud. Washington Co., season's requirement's culvert material and gravel.

LUMBER—**Bay St. Louis, Miss.**—Apr. 6, by Bd. Supervs. Hancock Co., furnishing various kinds and sizes lumber for period of 1 year. A. G. Favre, clk.

ENGINES, etc.—**Mendenhall, Miss.**—Apr. 7, by Mayor and Bd. Aldermen, furnishing with 2 Union gas engines 120 hp. with 75 kw. generator, switchboard and wiring. Mrs. V. C. Williams, town clk.

†BUSHINGS, etc. — **Vicksburg, Miss.** — Apr. 21, by U. S. Eng., Vicksburg, standard black malleable iron shoulder bushings, standard black malleable iron pipe caps, elbows, nipples, hot pressed hexagon nuts, wrought iron washers, delivery Vicksburg; structural steel angles, rounds, flats, squares, f.o.b. Greenville.

†CLAM SHELL BUCKET—**Vicksburg, Miss.**—Apr. 14, by U. S. Eng., 1 cu.yd. clam shell bucket, f.o.b. Vicksburg.

†FIRE HOSE, etc.—**Vicksburg, Miss.**—Apr. 20, by U. S. Eng., Vicksburg, 100 sections 50 ft. each single cotton jacket rubber lined fire hose; 2 gasoline engine driven electric generating sets, f.o.b. Vicksburg.

†WOOD PILES—**Kansas City, Mo.**—Apr. 16, by U. S. Eng., 232 Mfg. Exch. Bldg., 5,000 round wood piles (242,400 lin.ft.). $25,000.

†TELEPHONE EQUIPMENT—**Boulder City, Nev.**—Apr. 20, by Bureau Reclamation, Denver, Colo., 2 complete units of manual telephone equipment for installation in Boulder Dam and power plant, for Boulder Canyon Project. R. F. Walter, Denver, Colo., dist. engr.

†WIRE—**Brooklyn, N. Y.**—Apr. 14, by Signal Corps Procurement Dist., Army Base, 58th St. and 1st Ave., 30,000 ft. wire.

SEWER PIPE—**Utica, N. Y.**—Bd. Contr. & Supply taking bids sewer pipe for East Utica sanitary sewers in Sherman and Armory Drs. To exceed $1,000. J. B. Shaw, city engr.

STEEL PIPE, etc.—**Westfield, N. Y.**—S. R. Ross, Graystone Lodge, bids about Apr. 1, 1,900-2,000 ft. 6¼ in. steel pipe and connections. $1,400.

CULVERTS—**Bowebells, N. D.**—Apr. 9, by H. F. Magedanz, aud. Burke Co., furnishing corrugated metal, concrete culverts, standard sizes, piling, bridge plank and snow fence for 1936 season.

PIPE CULVERT—**Fargo, N. D.**—Apr. 10, by F. F. Doherty, aud. Cass Co., furnishing corrugated metal and rein.-con. culvert pipe, all sizes up to and incl. 60 in. for period ending May 1, 1937. R. W. Brownlee, co. surveyor.

CULVERT MATERIAL—**Hettinger, N. D.**—Apr. 9, by L. M. Howell, aud. Adams Co., furnishing 12- to 60-in. metal culvert materials ordered during 1936.

TRACTOR — **Hettinger, N. D.** — Apr. 8, by L. M. Howell, aud. Adamas Co., purchasing or rental one 60 hp. or more tractor, track type.

TRUCK—**York, Pa.**—Apr. 2, by W. H. Strine, secy., c/o Spring Garden Twp., York Co., 1½ ton dump truck, equipped with hydraulic hoist and dual wheels. To exceed $1,000. F. Hershner, 1530 1st Ave., superv.

†CRANES — **Charleston, S. C.** — Apr. 8, by Yards & Docks, Navy Dpt., Wash., D. C., furnishing one 5 ton and one 15 ton electric bridge crane and two 5 ton wall cranes at Navy Yard.

†*Federal Government.*

†WELDING MACHINE, etc. — **Charleston, S. C.**—Mar. 31, by U. S. Eng., Custom House, 1 portable gasoline driven arc welding machine, 300 amperes, mounted on steel wheels, with welding helmets with cover glass and 3 sets of lenses; 2 inspection sheets with cover glass, and 3 extra flexible asbestos or equivalent cable; 200 ft. flexible rubber covered cable and 3 steel wire scratch brushes for cleaning.

CONTRACTS AWARDED

DRAGLINE—**Los Angeles, Calif.**—H. E. Russell, purch. agt. Los Angeles Co., 524 North Spring St., 1 latest model 1½ cu.yd. Bucyrus or equal, dragline, Diesel engine driven (caterpillar D 11,000); dragline equipment to consist of all necessary drums, drum lagging cables, fair lead heaves, bucket, etc., to Crook Co., 2900 Santa Fe Ave., $22,240. Bids Feb. 20, awarded Mar. 12.

ELECTRIC METERS—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing electric meters for Bureau of Power and Light, Spec. 1879, to Sangamo Electric Co., 417 South Hill St., $19,973. Bids Mar. 11, awarded Mar. 17. Noted Mar. 3, C. D.

MOTOR TRUCKS—**Los Angeles, Calif.**—H. E. Russell, purch. agt. Los Angeles Co., 524 North Spring St., furnishing 2 trucks, 16,000 lb. gross capacity each, motor not less than 300 cu.yd. nor less than 88 hp. at 2,600 r.p.m., 4 speeds forward, 1 reverse, equipped with Brown-Lipe No. 6031 auxiliary transmission, 178 in. wheelbase, Spec. 769, to Diamond Truck Co., 2424 Santa Fe Ave., $2,719. Bids Feb. 10. Noted Feb. 6, C. D.

SNOW PLOW—**Los Angeles, Calif.**—H. E. Russell, purch. agt. Los Angeles Co., 524 North Spring St., 1 late model 1½ cu.yd. Bucyrus or 4 wheel truck chassis, front and rear drive, 4 cu.yd. dump body with heavy duty hydraulic hoist, 1 center mouldboard, 10 ft. wide, 7 ft. high, Spec. 9949, to Smith-Booth-Usher, 2001 Santa Fe Ave., $7,000 (used demonstrator); $1,000 allowed on trade-in. Bids Oct. 7. Noted Oct. 3, C. D.

STEEL ARCH RIBS—**Los Angeles, Calif.**—Metropolitan Water Dist., 306 West 3rd St., 318 steel arch ribs 6 in. for tunnel support, f.o.b. Indio, Bid 54680, to Consolidated Steel Corp., 6500 East Slauson Ave., $6,094. Awarded Mar. 12.

STEEL ARCH RIBS—**Los Angeles, Calif.**—Metropolitan Water Dist., S. A. Joseph, purch. agt., 306 West 3rd St., 150 steel arch ribs 8 in. for tunnel support, Bid 54681, to Consolidated Steel Corp., 6500 East Slauson Ave., $4,950. Awarded Mar. 12.

†STEEL PIPE—**Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., 53,460 lin.ft. galvanized steel pipe, Proposal 474, to Pennsylvania Iron & Steel Co., 2308 Santa Fe Ave., $8,361. Bids Mar. 2. Noted Mar. 9, C. D.

†VIBRATORS, etc.—**Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., 3 concrete vibrators long, flexible shaft, electrically operated, not less than ¼ hp. motor, and 3 with not less than 1½ hp. motor, to Viber Co., 206 South Spring St., $2,235•••1 gasoline driven engine generating set, to United Motors Service Co., 1225 South Grand Ave., $416•••2 concrete vibrators pneumatic, long, flexible shaft, to Brown Bevis Equipment Co., 4900 Sante Fe Ave., $350. Grand total $3,001. Bids Feb. 24. Noted Feb. 21, C. D.

†WIRE FENCE—**Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., miscellaneous wire fencing, Proposal 478, to Continental Steel Supply Co., 1233 East 63rd St., $6,109. Bids Mar. 2, awarded Mar. 10. Noted Mar. 9, C. D.

CAST IRON WATER PIPE—**San Francisco, Calif.**—T. A. Brooks, city purch. ag't., City Hall, 5,000 ft. 4 in. c.i. water pipe for Municipal Water Dpt., Bid 1518, to U. S. Pipe & Fdry. Co., Monadnock Bldg., 43.57c. per ft. Bids Mar. 6, awarded Mar. 16. Noted Mar. 17, C. D.

†PILES—**San Francisco, Calif.**—U. S. Eng., Custom House, furnishing, driving 70 wrought untreated piles on shoal in San Francisco Bay, north of Yerba Buena Island, to B. C. Gerwick, 112 Market St., $2,060. Bids Mar. 2, awarded Mar. 16.

FIBRE CONDUIT—**Chicago, Ill.**—City, City Hall, furnishing, delivering 66,000 ft. 3½ in. fibre conduit, to General Electric Supply Co., 44 West South Water Market, Chicago, $6,930. Bids Feb. 28, awarded Mar. 12. Noted Mar. 5, C. D.

METER COUPLINGS — **Chicago, Ill.** — City, City Hall, furnishing, delivering 3,500 bent meter couplings for 1 in. water meters and 7,000 bent meter couplings for ¾x¾ in. water meters, to Badger Meter Mfg. Co., 2371 North 30th St., Milwaukee, Wis., $2,205. Bids Feb. 27, awarded Mar. 12. Noted Feb. 21, C. D.

PIPE COVERING—**Chicago, Ill.**—City, furnishing, delivering, applying non-conducting covering for cold water pipe, steam and hot water system, pipes, boilers, etc., to W. J. Donohoe, 390 South Michigan Ave., $30,302. Bids Feb. 13, awarded Mar. 11. Noted Feb. 21, C. D.—Feb. 27, E. N.-R.

PORTLAND CEMENT, etc.—**Chicago, Ill.**—City, City Hall, Portland cement and crushed limestone and limestone screenings, to Consumers Co., 111 West Washington St., $3,435 and $5,500 respectively. Bids Feb. 25. Noted Feb. 28, C. D.

LUMBER—**Davenport, Ia.**—Scott Co., A. O. Kirth, co. aud., 96,000 ft. B.M. Class D Douglas fir lumber and 3,200 ft. B.M. Class C white pine lumber, to H. H. Schneckloth Lumber Co., Walcott, Ia., $36.75 per 1,000 and $45 per 1,000 respectively, total $3,672. Bids Mar. 10. Rejected bids Mar. 10, 72,866 ft. B.M. creosoted lumber and 1,980 lin.ft. creosoted piling. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

GRANITE CURBING, etc.—**Boston, Mass.**—Commonwealth of Massachusetts, Dpt. Administration & Finance, G. C. Cronin, purch. agt., State House, granite curbing, edging and curb inlets for various W.P.A. Sidewalk Construction Projects in various parts of State, to H. E. Fletcher Co., West Chelmsford. Bids Dec. 23. Noted Dec. 19, C. D.

IRON CASTINGS—**Boston, Mass.**—City, Supply Dpt., D. F. Doherty, supt., City Hall Annex, 100,000 lb. Class "E" iron castings, to E. L. Le Baron Fdry. Co., Commercial Yard, Brockton, $1,950•••600,000 lb. Class "B" iron castings, to Mechanics Iron Fdry. Co., 38 Kemble St., Boston, $20,400. Bids Feb. 26, awarded recently. Noted Mar. 2, C. D.

ASPHALT EMULSION, etc. — **Springfield, Mass.**—C. W. Phillips, supt. Dpt. Streets & Engineering, Administration Bldg., asphalt emulsion, to Texas Co., 101 Albany St., 7.18c. per gal.; 85% road oil, to American Oil Products Co., 100 Washington St., Somerville, $15.43 per ton•••granite curbing, to H. E. Fletcher Co., Groton Rd., West Chelmsford•••gravel borrow, to P. Tebaldi, 479 Main St., Indian Orchard, 90c. per cu.yd.•••sand borrow, to F. W. Hanchett, Westfield, 79c. per cu.yd.••• gravel for surfacing, to E. W. Christianson, 2 School St., East Longmeadow, $1.25 per cu.yd. •••trap rock, to John S. Lane & Son, Inc., Westfield, all for Departmental and Federal Emergency Relief Projects as required. Noted Mar. 2, C. D.—Mar. 5, E. N.-R.

SAND BORROW, etc.—**Springfield, Mass.**—City, Dpt. Streets & Engineering, Administration Bldg., sand borrow, to F. W. Hanchett, Westfield, at 79c. per cu.yd.•••asphaltic emulsion, to Texas Co., 101 Albany St., 7.18c. per gal.; 85% road oil, to American Oil Products Co., 100 Washington St., Somerville, $15.43 per ton•••gravel borrow, to P. Tebaldi, 479 Main St., Indian Orchard, 90c. per cu.yd.•••gravel surface, to E. N. Christianson, 2 School St., East Longmeadow•••trap rock, to John S. Lane & Son, Inc., Trap Rock Quarries, Westfield. Noted Mar. 2, C. D.

RUBBER FLOORING—**Minneapolis, Minn.**—City, furnishing 6,500 sq.ft. rubber flooring, to Minneapolis Linoleum Co., 246 Nicollet Ave., $2,543. Bids Mar. 6. Noted Feb. 27, C. D.

SNOW REMOVER — **Worthington, Minn.** — Nobles Co., W. C. Thom, aud., furnishing 1 rotary snow remover of auger type, to Klauer Mfg. Co., 9th and Washington Sts., Dubuque, Ia., $11,500. Bids Mar. 3. Noted Feb. 26, C. D.

†CARBON STEEL, etc.—**Kansas City, Mo.**—U. S. Eng., 232 Mfg. Exch. Bldg., 97,800 lb. carbon steel and semi-steel castings, to Sterling Steel Constr. Co., East St. Louis, Ill., $7,935; Lot 2, to Gwathmey Mfg. Co., Harrisonville, $343. Bids Mar. 17, awarded Mar. 19. Noted Mar. 5, C. D.—Mar. 12, E. N.-R.

†WOODEN PILES—**Kansas City, Mo.**—U. S. Eng., 232 Mfg. Exch. Bldg., 93,000 lin.ft. wooden piles from 26 to 66 ft., to J. W. Grantham, Terry, Miss., $9,529. Est. $9,000. Bids Mar. 2, awarded Mar. 10. Noted Mar. 13, C. D.—Feb. 20, E. N.-R.

†DRAGLINE EXCAVATOR, etc. — **Boulder City, Nev.**—Bureau Reclamation, Denver, Colo., one ¾ cu.yd. dragline excavator, to General Excavator Co., Marion, O., $7,627; 2 dragline buckets, to Isaacson Iron Wks., 2917 East Marginal Way, Seattle, Wash., $550, above for Humboldt Project. Bids Feb. 17. Noted Feb. 25, C. D.

†METER WORK—**Boulder City, Nev.**—Bureau Reclamation, Denver, Colo., miscellaneous metal work for Boulder Power Plant, Boulder Canyon Project, to Lakeside Bridge & Steel Co., 3200 West Van Buren St., Milwaukee, Wis., $8,277. Bids Feb. 20, Awarded Feb. 13, C.D.

†OIL CIRCUIT BREAKERS, etc. — **Boulder City, Nev.**—Bureau Reclamation, Dpt. Interior, Boulder City, circuit breakers for Boulder Dam Power Plant, to Pacific Electric Mfg. Co., 357 South Hill St., San Francisco, Calif., $15,715; disconnecting switches, to Bowie Switch Co., San Francisco, Calif., $7,046. Bids Nov. 29. Noted Nov. 14, C.D.—Nov. 21, E.N.-R.

ROAD EQUIPMENT—**Raleigh, N. C.**—Div. Purchase & Contract, Raleigh, to Ford Motor Co., 329 South Blount St., furnishing one hundred 1½ ton truck chassis, ninety at $552 and ten at $574 each•••to St. Paul Hydraulic Hoist Co., 2207 University Ave. S.E., Minneapolis, Minn., ninety-five 1½ cu.yd. steel dump bodies with 6 in. hydraulic hoist, 89 at $116 and 6 at $122•••to Chevrolet Motor Co., 522 West 11th St., Charlotte, 20 pick-up trucks at $423

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Materials, etc. (Continued)

•••to E. F. Craven Co., Greensboro, one 165 gal. tar kettle, $229; 1 rotary broom, $825; one 315 cu.ft. air compressor, $4,275; one 400 gal. utility spray tank, 6 ft. bar, $1,024; five jackhammers, $190 each•••to Mitchell Distributing Co., Spruce Pine, 5 jackhammers at $190 each; one 315 cu.ft. air compressor, $4,275•••to Dillon Supply Co., 216 South West St., two 7-S concrete mixers at $645 each••• to Carolina Tractor & Equipment Co., 733 West Hargett St., two 10 ton trailers at $1,212 each•••to North Carolina Equipment Co., 3116 Hillsboro St., five 10x20 rock crushers at $1,817 each. Bids Mar. 13. Bids held until Mar. 17, for furnishing gas shovels, 4 clamshell excavators and ten 105 cu.ft. air compressors. Noted Mar. 9, C. D.

GRADER—**Grafton, N. D.**—Walsh Co., W. J. LaMarre, aud., elevating grader, engine driven, to Northwest Sheet & Iron Wks., Wahpaton, N. D., $3,985. Bids Mar. 5. Noted Feb. 26, C. D.

PIPE, etc.—**Canton, O.**—R. A. Bauhof, dir. P. Serv., to U. S. Pipe & Fdry. Co., Koppers Bldg., Pittsburgh, Pa., centrifugal iron pipe, $2,886; special castings, $394 and $442•••to Canton Hardware Co., 1221 3rd St., N.E., 1¼ and 2 in. valves, $163•••to Canton Supply Co., 201 Buckeye Pl., S.W., 4, 8 and 12 in. valves, $448; curb and corporation cocks, $360•••to Crane Co., 210 Piedmont Ave., galvanized steel pipe, $827; galvanized fittings $222; curb and valves boxes, $755. Grand total $6,497. Noted Feb. 25, C. D.—Feb. 27, E. N.-R.

DELIVERY TRUCK—**Cincinnati, O.**—H. P. Wagner, city purch. agt., 1 panel body delivery truck for Bd. Park Comrs., to Cincinnati Dependable Motor, 1401 Reading Rd., $580. Bids Feb. 26, awarded Mar. 12. Noted Feb. 17, C.D. —Feb. 20, E.N.-R.

ROAD OIL—**Cincinnati, O.**—City, furnishing road oil to Dpt. P. Wks., to Cincinnati Quarries Co., 6 East 4th St., $2,480. Bids Feb. 19, awarded Mar. 14. Noted Feb. 7, C. D.—Feb. 13, E. N.-R.

SULPHATE of ALUMINA—**Piqua, O.**—City, furnishing 40 tons sulphate of alumina, to Welch Chemical Co., 8 East Cong. St., Columbus, $1,040. Awarded Mar. 11.

TRUCKS—**Seattle, Wash.**—City Water Dpt., County-City Bldg., four trucks, to International Harvester Co., 916 Maynard St., $3,827. Awarded Mar. 12.

GRADERS—**LaCrosse, Wis.**—City, 2 graders, to Cunningham-Ortmayer Co., 429 West Michigan Ave., Milwaukee, $1,000•••3 graders, to Bark River Bridge & Culvert Co., Eau Claire, $1,020•••5 graders, to T. W. Rosholt Co., Wausau, $1,485. Grand total $3,505. Bids Feb. 28.

†SEWER PIPE—**Menomonie, Wis.**—Treas. Dpt. at office Sup. Archt., Wash., D. C., 1,000 ft. 6 in. c.i. water pipe in 12 ft. lengths, f.o.b. River Falls, to Lynchburg Fdry. Co., 122 South Michigan Ave., Chicago, Ill., at 89.5c. per ft. Bids Mar. 11. Noted Mar. 10, C.D.

†DERRICK, etc.—**Milwaukee, Wis.**—National Park Service, stiff legged derrick, to Hunter Tractor & Mchy. Co., 327 South 16th St., $628; fencing materials, to Northwestern Hardware Co., 1209 North 3rd St., $561. Awarded Mar. 11.

STEAM HEATING MATERIAL, etc.—**Shorewood, Wis.**—Village, furnishing steam heating material, to Cordes Supply Co., 441 North 2nd St., $939•••pipe covering, to Rundle Spence Mfg. Co., 445 North 4th St., $242•••plumbing material, to S. V. Hanley Co., 1653 North Farwell Ave., $750•••wood overhead doors, to C. C. Banholzer, 728 North Jefferson St., $344 •••electrical wiring material, to Standard Electric Shop, 1045 North 5th St., $331•••hardware, to H. F. Haessler Hardware Co., 414 East Mason St., $255•••lumber, celotex, to Steinman Lumber Co., 500 East Keefe Ave., $510 •••millwork, to Marks Bros. Co., 8301 West Laphan St., $450•••millwork, interior trimming, to Badger Sash & Door Co., 1742 North Palmer Ave., $595, all contractors in Milwaukee. Grand total $4,411.

FOREIGN

Argentina—Government, Buenos Aires, granted $12,186,000 to State Railways Administration, Buenos Aires, for improving and extending railway system, raods, highways, river and harbor development, etc.

Australia—American Smelting & Refining Co., 120 Bway., New York, plans constructing low grade gold ore mill 500 tons daily capacity, in **Big Bell Mines**, Western Australia, $100,000 •••State of Western Australia, **Perth**, plans constructing railway from Cue to Big Bell Mining properties, to exceed $500,000.

Australia, Port Pirie—Ministry of Railways constructing 52 mi. standard gage railway from Port Pirie to Stirling, to **Farley & Lewers**, Sydney, $802,520.

Austria, Vienna—Heinrich Liedbling, Hessagasse 1, in market for ferro manganese. Amount of purchase depends on price and quality. Custom duty free.

Borneo—Batavia Petroleum Co., c/o Royal Dutch Shell Petroleum Co., Amsterdam, Netherlands, plans oil and gas exploration, Banto Dist. (600,000 hectares concession given). To exceed $300,000.

China, Nanking—Chinese Government, Nanking, China, air conditioning for aircraft works and office buildings, 500 tons air conditioning equipment, to **York Ice Mchy. Co., York, Pa.**

China, Straits Settlement, Singapore—May 25, by Chief Engineer Singapore S. S., year's supply charge dial type water meters. State unit price.

Cuba, Havana — Perez Hermanas, S, EnC, Luyano & Lopez, Luyano, in market for spruce planks and boards. Cables "Perezmanos." Custom duty 0.50 per 100 kilos gross weight with 0.20 preference to U. S. A.

Dutch East Indies, Sumatra — Pacific Petroleum Co., c/o Standard Oil Co. of Calif., 225 Bush St., San Francisco, Calif., plans oil and gas development, in Rokan Dist. To exceed $300,000. Owner has obtained 600,000 hectare concession for this purpose.

England—Camberwell Boro Council taking bids end of March for lighting all streets by electricity, incl. 140 mi. streets, to have especially graded illumination in order to ensure good and even visibility and the lighting to be by 1,000 mercury vapor electric discharge lamps at 400 and 250 watts, and mounted on lanterns in staggered formation 25 ft. height above roadway.

England—Hammersmith County Council prepares plans for nurses home at Hammersmith Hospital, $522,975•••Central Tar Distillers, Ltd., c/o G. J. Withington, The Gables, Francio Rd., **Birmingham**, plans plant•••Lincoln Wax Co. Ltd., c/o S. G. Miller, 56 Maple Crescent, **Sideup**, plans plant for distilling and extracting solid liquid and gaseous substance from coal, etc.•••Modern Pitching Ltd., J. W. Huxley, Hillier House, Hillier Rd., **Guildford**, prepares plans factory for manufacturing pitching machines•••**Leeds** Municipality, constructing 708 houses, to Tarran Industries, Ltd., Clough Rd., Hull, $1,074,385•••Durham County Council, **Hull**, constructing institutional building, to Kettlewell Sons & Co., Ltd., Colonial Ave., $516,745 •••S. N. Cooke, Sun Bldg., Bennets Hill, Birmingham, preparing plans office block for Petroleum Corporation, Ltd., **Rugby**, $650,000 •••A. E. Morrison Ltd., **Leicester**, prepares plans plant for manufacturing electric vehicles••• F. G. Glass, 15 Turner St., **Manchester**, prepares plans factory on New Bridge St., $525,000 •••Vauxhall Motors, Ltd., **Luton**, prepares plans extensions, bids in July, $1,000,000••• Wells & Winch, **Biggleswode**, prepares plans brewery, $600,000•••Flint & Sayner, 4 Grove Parade, **Buxton**, prepares plans plant expansion for Brake Lining Co., Ltd., Bridge St., $500,000•••Alpha Cement Works Ltd., **Cliffe**, prepares plans dust arresting plant•••Coal Oil Development, Great Britain Ltd., **Belmont**, plans oil from coal plant at large colliery, County Durham, $600,000•••Joseph Pugsley & Son Ltd., Lawrence Hall, **Bristol**, in market for 2 economic type boilers about 14x8 ft., 160 lb. pressure and 1 Lanchashire boiler 30x8 ft., 120 lb. pressure •••Milkridge Coal Co., Ltd., **Milkridge** (Northumberland), in market for 7 stone breakers 20 to 30 in. jaw, also for machines (3) for making chippings, bunkers, electric screens, air compressors, quarrying tools, pipes, rails, and tip waggons.

England—St. Helens Municipality votes $520,770 for new office building•••**Weymouth**, Stewart Smith preparing plans 600 dwellings, $610,000.

England, London—H. E. Coley, Charterhouse Sq., East Central, making plans 3 story hotel on Esplanade at Seaford, $875,000•••Silcock & Simpson, engrs., 25 Victoria St., Westminister, Southwest, prepares plans and tenders invited by H. Wilson, clk., Guisley Urban Dist. Council, Guisley, Yorkshire for supplying and erecting pressure filter, head 350 ft. capacity, 5,000 gal. per hour, also for constructing bore hole 24 in. diam., 200 ft. and necessary steel lining tubes, etc.

Germany, Jena—Gerhard Heydrich, in market for crystalized fluorspar. Quantity depends on price and present competitive price is for good quality crystals, size ¼x¼x¼ in. about $2.50-$3.75 per lb., large crystals of first quality $6 per lb. Specifications, clear crystalized fluorspar, free from cracks and impurities in the interior sizes of ¼x¼x¼ in. and larger.

India—Apr. 28, by Director Indian Stores Dpt., **New Delhi**, supplying 600 kw. crude oil engine driven alternator and accessories••• Apr. 21, by Director Indian Stores Dpt., **Simla**, for year's supply wall plugs, ceiling roses, etc., state unit price.

Irish Free State, Dublin—City bids in April, school building scheme. $1,000,000.

New Zealand—Electric Power Board, **Grey**, prepares additional electric works on Arnold River, incl. increasing generating capacity to 3,100 kw. and constructing automatically operated gates hinged to crest of dam•••Apr. 14, by Secretary Public Wks., Supplies & Tenders Commtitee, **Wellington**, supplying pumping sets for cooling water; Apr. 21, for supplying Diesel electric generating set and switchgear, 30,000 kva. transformers bank and switchgear and steel work •••Apr. 13, by General Manager, New Zealand R.R., **Wellington**, for supplying electrical multiple unit motor coaches.

New Zealand, Auckland—Apr. 28, by General Manager Auckland Harbor Bd., supplying three 5 ton electric capstans.

New Zealand, Wellington — General Manager New Zealand R.R. invites prospective tenderers to list names for supply of R.S.A. terminals and cylinder oil•••Director General, Post & Telegraph Dpt. invites names for switchboard plugs, battery testing sets, automatic dials, bridging coils, terminal and leading in insulators, 2 microfarad condensors and 50 watt resistance lamps. Secretary Public Wks. & Tenders Committee invites names for supply indoor switchgear, and mimic buspanels, geared electric motors and switchgear, and metering equipment.

Northern Ireland, Belfast—City Electrical Engineer, East Bridge St., taking bids supplying, erecting steam boiler plant with accessories for coal handling plant construction•••Inglis & Co. Ltd. making plans biscuit factory, $500,000.

Portuguese East Africa, Lourenco Marques—Apr. 13, by Port & Railway Administration, year's supply rubber insulated cable, and flexible steel wire cable, unit prices.

Scotland — Kirkeady Municipality votes to construct 240 houses, $525,000, Deas & Bertham, Central Chambers, archts.•••Michael Nairn & Co. Ltd., **Kirkeady**, plans extending linoleum works, $550,000•••Nobels Esplores Ltd., Glasgow, plans plant for manufacturing explosives, **Irvine**, $700,000•••Fairfield Shipbuilding & Eng. Co. Ltd., Govan Rd., Glasgow, plans additional buildings, $600,000•••Steel Co. of Scotland, Blockairn Rd., **Glasgow**, plans plant extension, $1,000,000•••Ioco Rubber & Waterproofing Co. Ltd., Annilsland Rd., Glasgow, plans additional plant, $500,000•••Colville & Co. Ltd., **Motherwell**, plans new plant, incl. steel bar and rolling mills•••Renfewshire County Council **Clarkston**, voted 524 house construction, $714,000•••College of Art Senate, **Dundee**, to call competitive plans new buildings, $450,000.

Wales, Cardiff—Talwyn Lloyd, 6 Cathedral Rd., preparing plans housing development 650 acre estate for Welsh Land Settlement Bd. $1,500,000.

PUBLIC BUILDINGS

PROPOSED WORK

Calif., Fresno—Fresno City School Dist. plans by Allied Architects, c/o Bd. Educ., 2 story, rein.-con. school administration building, O and Mariposa Sts. $150,000. Will be financed in part with P.W.A. grant. F. W. Kellberg, 320 Market St., San Francisco, engr.

Calif., Los Angeles—Los Angeles Bd. Educ., Chamber of Commerce Bldg., plans by S. P. Hunt, 701 Laughlin Bldg., Los Angeles, and soon takes segregated bids for 2 story, 58x171 ft., 64x220 ft. and 58x171 ft., new administration building at Virgil Junior High School, 152 North Vermont Ave. $175,000. S. P. Hunt, 701 Laughlin Bldg., Los Angeles, archt. E. L. Ellingwood, H. W. Hellman Bldg., and W. Mellema, 1661½ Beverley Blvd., engrs.

★ **Calif., Sacramento**—Sacramento City School Dist., plans by Starks & Flanders, Bank of America Bldg., Senior High School gymnasium, $90,000; and main high school building, West Freeport Blvd., $645,000.

Calif., Santa Cruz—City plans by A. Collins, 237 East Cliff Dr., 1 story, 100x188 ft., U-shaped, rein.-con. city hall.

Colo., Delta—City, c/o City Clerk, plans constructing either a steam or Diesel municipal power and light plant. $197,000. Wood & Weber, Wilda Bldg., Denver, engr. P.W.A. grant and loan approved. Noted Nov. 18, C. D. —Nov. 21, E. N.-R.

Conn., New London—Bd. Educ., inviting preliminary estimates for 2 story, basement, brick, steel addition to Chapman Technical High School, Waller St. $150,000. A. G. Creighton, 140 State St., archt. Noted Dec. 19, C. D.—Dec. 26, E. N.-R.

★ **D. C., Wash.**—Treas. Dpt. Pub. Wks. Branch, plans constructing building for general acounting officer. $4,700,000.

★ **†D. C., Wash.**—Treas. Dpt. at office Sup. Archt., Wash., D. C. plans constructing extension for Government Printing Office, $5,885,000.

Ind., Muncie—School Bd. making plans constructing Junior High School, North Walnut St., and enlarging Riley School into Junior High School. $150,000. Architect not appointed.

Kan., Emporia—City plans by Brinkman & Hogan, Citizens Bank Bldg., brick, stone city hall. Est. $300,000. Application for loan and grant pending. Bond election in April.

La., Lake Charles—Calcasieu Parish School Bd., J. N. Wetherill, pres., plans by H. J. Duncan, Alexandria, schools in Iowa, $75,000; in Westalake, $50,000; and one in Starks, $50,000.

Me., Orono—University of Maine, A. A. Hauck, pres., plans by C. P. Crowell, 6 State St., Bangor, 3 story, basement, brick, steel, stone men's dormitory, concrete found. Oak Hall. To exceed $140,000.

†Md., Aberdeen—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans 1 story, basement U. S. Post Office. $65,000.

Md., Elkton—Bd. Educ. Cecil Co., plans new Elkton High School building. $180,000. Maturity depends upon allocation of funds. Architect not appointed.

Md., Hagerstown—Comrs. Washington Co. plans municipal building. $228,000. Maturity dependent upon allocation of funds. Architect not appointed.

Md., Kensington—Bd. Educ. Montgomery Co., Court House, Rockville, constructing Junior High School at Kensington; improvements at

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†Federal Government.

Public Buildings (Continued)

Cherry Chase School; purchase of additional land at Takoma Park School and at Bethesda School; grading at Damascus School and new negro schools, at Quince Orchard, Senaca, Wheaton, Mt. Zion, Hyattsville and Unity; and additional classrooms at various schools. $360,000.

★ **Md., Roxbury**—State, Bd. Welfare, Union Trust Bldg., Baltimore, plans penitentiary building to house 1,000. $1,500,000. Architect not appointed.

Md., Salisbury—School Comrs. Wicomico Co., Court House, plans 4 schools at various locations. $450,000. Maturity dependent upon Legislative authority. Architect not appointed.

Michigan—See "Unclassified."

Mass., Belmont—Town, J. W. Flett, chn. Bd. Selectmen, Town Hall, sketches by Coolidge, Shepley, Bulfinch & Abbott, 1 Court St., Boston, 3 story, basement, brick, steel, stone, high school addition, concrete found., School St. $300,000. P.W.A. grant $133,650. Noted Mar. 27.

Mass., Chicopee—City, A. J. Stonina, mayor, City Hall, takes bids later on separate contracts for 2 story, basement, brick, steel, stone hospital and infirmary, concrete found., Front St. Total est. $125,000-$150,000. Excavation by day labor. H. J. Tessier, 220 Dwight St., Springfield, archt. Noted June 26, 1934, C. D.—June 28, 1934, E. N.-R.

Mich., Flint—City plans by Lyndon & Smith, Robert Oakman Bldg., Grand River and Oakman Blvd., Detroit, 2 story, basement, brick, steel, rein.-con. high school, plain found., South Beecher Dist. $150,000. P.W.A. project.

Mo., Kirkwood—Kirkwood School Dist., H. E. Suits, pres. Bd. Educ., soon takes bids constructing Francis E. Nipper Junior High School addition, 702 South Kirkwood Ave., G. R. Robinson School addition, 703 South Couch Ave., W. W. Keyser School addition, Geyer Rd., W. B. Ittner, Inc., 408 Bd. Educ. Bldg., St. Louis, archts.; constructing J. Milton Turner School addition, Saratoga and Milwaukee Sts., new school buildings in North Glendale and in Osage Hills, Bonsack & Pearce, Inc., 411 Olive St., St. Louis, archts. $418,000. $188,000 P.W.A. grant.

Mo., St. Joseph—State Building Comn., Jefferson City, plans nearing completion by L. R. Bowen, Jefferson City, 3 story, basement, 41x350 ft., brick, steel diagnostic building. $300,000. P.W.A. project. C. A. Haskens, 426 Capitol Bldg., Jefferson City, engr.

★ **Mo., St. Louis** — Bd. P. Service, B. L. Brown, pres., 304 City Hall, plans by A. Osburg, 301 City Hall, constructing nine 1 story, rein.-con., brick, stone fire stations, $500,000. P.W.A. grant $225,000 approved. W. C. E. Becker, city engr.

Neb., Lincoln—University of Nebraska, Lincoln, plans constructing building for student union activities. $400,000. Applied for $180,000 P.W.A. grant, balance to be donated.

†**N. M., Fort Bayard**—U. S. Veterans Hospital, Fort Bayard, plans constructing recreation hall, at U. S. Veterans Hospital, here. $110,790. W.P.A. project.

N. Y., Almond—Central School Bd., plans constructing Central School building. To exceed $140,000. Architect and engineer not appointed.

N. Y., Albany—Albany Port Comn., D. LaDue, chn., Albany, P.W.A. grant of $90,000 has been announced for construction of warehouse and dock on Hudson River front. $200,000. Work cannot commence until actual allotment is made which will depend upon Congressional action in approving additional funds for P.W.A. project.

N. Y., Bradford—Bd. Educ. bids in April, general contract plumbing, electrical work and heating for school. P.W.A. project. R. A. Freeburg, Freeburg Bldg., Jamestown, archt. Noted Dec. 27, C. D.—Jan. 2, E. N.-R.

N. Y., Canaseraga—Central School Dist. plans constructing central school. To exceed $140,000. Engineer and architect not appointed.

†**N. Y., Gowanda**—Treas. Dpt. at office Sup. Archt., Wash., D. C., bids in spring constructing U. S. Post Office, Main St. $68,000.

N. Y., Johnson City—Bd. Educ. plans by W. A. Whittock, Binghamton, constructing Roberts Street School. $285,000. Owners will open bids Mar. 26 for bonds for project.

†**N. Y., LeRoy**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes new bids constructing U. S. Post Office. $45,745. Former contractor filed petition in bankruptcy. Noted Jan. 3, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

N. Y., Marlboro—Central School Dist. 1, takes bids probably in April, constructing superstructure school. $371,426. P.W.A. project. G. W. Betz, 286 Wall St., Kingston, archt. Noted Jan. 2, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

★ **N. Y., Solvay**—New York State Fair Industrial Exhibit Authority, Denison Bldg., Syracuse, bids in April, constructing horticultural and pure foods buildings, also plans constructing machinery building during 1937. $600,000. P.W.A. project. A. L. Brockway, Clinton Sq. Bldg., archt. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

†*Federal Government.*

†**N. Y., Springville**—Treas. Dpt., at office Sup. Archt., Wash., D. C., bids in spring, constructing U. S. Post Office, Franklin St. $65,000. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

N. Y., Syracuse—Bd. Supervs. Onondaga Co., Court House, plans nearing completion by Randall & Vedder, S. A. & K. Bldg., constructing county jail, Cedar Ave. $140,000.

†**N. Y., Ticonderoga**—Treas. Dpt. at office Sup. Archt., Wash., D C., bids in May constructing U. S. Post Office, Main St. Noted Nov. 27, C. D.—Dec. 5, E. N.-R.

N. Y., Tuckahoe—Bd. Educ. plans elementary school for Chester Heights Section School Dist. 2, Hewitt Ave. $200,000. Architect and engineer not appointed.

†**N. Y., Waverly**—Treas. Dpt. at office Sup. Archt., Wash., D. C., bids in spring, constructing U. S. Post Office, Waverly St. $75,000. Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

†**N. Y., West Point**—Con. Q. M., U. S. Military Academy, reconstructing stable at U. S. Military Academy recently destroyed by fire.

†**N. C., North Wilkesboro**—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids Feb. 24, constructing vault passage, driveway extensions at U. S. Post Office. Noted Feb. 20, C. D.

★ †**O., Chillicothe**—Vet. Bu., Administration Bldg., Wash., D. C., soon takes bids constructing new chemical and administration building, ward building, converting present administration building into hospital. $650,000.

O., Minerva—Village Bd., Village Hall, soon takes bids $75,925 worth of new generating machinery and equipment for installation in municipal light and power plant. Funds available for equipment from profits of plant. H. R. Hadlow, 13325 Foresthills Ave., Cleveland, engr.

★ **O., Sandusky** — City, constructing power plant, project held up for several months owing to legal delays. $1,000,000. Burns & McDonnel Eng. Co., 107 West Linwood Blvd., Kansas City, Mo., engrs. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

Ore., Salem—State Bd. Control plans constructing central heating and power plant to serve capitol group state buildings. $450,000. $206,292 grant by Federal Public Wks. Administration offered state.

Pa., Arnold—Bd. Educ. plans by A. Thayer, 408 Greer Bldg., New Castle, 2 story, basement, brick, steel school building. $300,000. Special bond issue defeated, further action after next Board meeting. Noted Feb. 20, C. D.—Feb. 27, E. N.-R.

Pa., Arnold—Bd. Educ. soon takes bids high school. $260,000. Thayer Co., New Castle, archts.

†**Rhode Island** — Vet. Bu., Administration Bldg., sketches neuro-psychiatric hospital. Site not selected.

R. I., Burrillville—State, Emergency P. Wks. Comn., J. A. O'Brien, secy., State Office Bldg., Providence, plans by Waterman Eng. Co., engrs., 86 Weybosset St., Providence, constructing c.i. water pipe and vitr. clay and concrete sewer pipe connections for various new buildings now under construction.

R. I., Burrillville—State, Emergency P. Wks. Comn., J. A. O'Brien, secy., State Office Bldg., Providence, plans by Jenks & Ballou, 2600 Industrial Trust Bldg., Providence, for underground conduit steam and electrical connections to various new buildings now under construction.

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., J. A. O'Brien, secy., State Office Bldg., Providence, plans by Waterman Eng. Co., engrs., 86 Weybosset St., Providence, constructing c.i. water pipe and vitr. clay and concrete sewer pipe connections for various new buildings.

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., J. A. O'Brien, secy., State Office Bldg., Providence, plans by Jenks & Ballou, 2600 Industrial Trust Bldg., Providence, underground conduit steam and electrical connections to various new buildings now under construction.

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., State House, Providence, rejected bids Dec. 27, hospital at State Infirmary. Noted Dec. 19, C. D.

R. I., Woonsocket—City, L. M. Farrin, supt. schools, City Hall, plans by (probable), W. F. Fontaine & Sons, 285 Main St., rebuilding 2nd Ave. School or building addition to 5th Ave. School. To exceed $150,000.

†**S. C., Charleston**—U. S. Dpt. Agriculture, Wash., D. C., plans 2 story laboratory and office building, 2 large greenhouses, work foreman's cottage, barns and garages for 451 vegetable breeding project, Charleston Co. $30,000.

†**Texas**—Bureau Federal Prisons, Wash., D. C., plans constructing federal prison building, probably at San Antonio or Uvalde. $400,000.

Tex., Tyler—Bd. Educ., Tyler, voted bonds brick, rein.-con. public school improvements consisting of new units and 2 new elementary buildings. $350,000. R. Bryan, Construction Bldg., Dallas and Tyler, archt.

†**Vt., Fort Ethan Allen**—U. S. Property & Disbursing Officer, State House, Montpelier, cancelled bids to have been opened Mar. 17, rebuilding officers' mess hall, at Fort Ethan Allen. Noted Feb. 27, C. D.

Alaska, Seward—Municipality plans electric light and power plant. Hubbel & Waller Eng. Co., Alaska Bldg., Seattle, Wash., engrs.

Que., Quebec City—Dpt. P. Instruction, approves construction 42 new rural schools. $175,000.

BIDS ASKED

†**Ala., Evergreen**—Apr. 16, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $60,000. Noted Oct. 21, C. D.—Oct. 24, E. N.-R.

†**Ala., Fayette**—Apr. 21, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000.

†**Ark., Wynne**—Apr. 21, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000.

†**Calif., Crescent City**—Apr. 8, by P. Wks. Officer, Mare Island, Calif., repairing and altering dormitory and compass house, installing road culverts, at U. S. Naval Director Finder Station, Point St. George, Spec. 8148.

†**Calif., Table Bluff** (P. O. Eureka)—Apr. 8, by P. Wks. Officer, Mare Island, repairing buildings and new water tank at U. S. Naval Radio Station (Eureka), Spec. 8149.

★ †**D. C., Wash.**—Treas. Dpt. Public Works Branch, Wash., D. C., bids about Apr. 15, constructing building for Bureau of Engraving and Printing. $5,500,000.

†**Ind., Evansville**—Apr. 16, by P. Wks. Administration, Div. Housing, Wash., D. C., constructing foundations for Lincoln Garden Housing Project, Project H-3801. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

†**Ind., Hobart**—Apr. 15, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $67,000.

†**Ia., Muscatine**—Apr. 21, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office. $120,000.

†**Md., Cheltenham** — Apr. 15, by Yards & Docks, Navy Dpt., Wash., D. C., constructing 3 quarters, barracks, 2 radio buildings, boiler house, chimney and four garages. Noted Mar. 19, C. D.—Mar. 26, E. N.-R.

Mass., Holyoke—Mar. 30, by T. Epstein, chn., 1 and 2 story, 100x80 ft., brick, stone auditorium, Maple and Appleton Sts., for City Municipal Offices. $200,000. P.W.A. project. Franz & Cunniff, 316 High St., archts.

†**Minn., Marshall**—Apr. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $75,000.

Neb., Columbus and Monroe—Apr. 2, by Loup River Pub. Power Dist., C. F. Fricke, pres., 2307 13th St., Columbus, 25 ton electric traveling crane with 33 ft. span; six 14x14 ft. truck type gates; three 40 ton gate hoists, one 5 ton gate hoist with hoist tower, at Monroe; one 75 ft. ton electrical traveling crane with 15 ton auxiliary hoist with 39 ft. span; three 20x20 ft. truck type gate hoists; three 40 ton gate hoists at Columbus; and transformer trucks, at Monroe and Columbus. P.W.A. project. Harza Eng. Co., 205 West Wacker St., Chicago, Ill., engrs.

†**Nev., Boulder City** — Apr. 10, by Bureau Reclamation, Boulder City, furnishing, installing structural glass accessories, marble, hollow tile partitions for lobbies in 2 elevator towers on Boulder Dam, furnishing, installing paneled railings of structural glass and aluminum for control rooms in Boulder Power Plant, aluminum doors and appurtenant hardware for structural glass work, for Boulder Canyon Project, about 7 mi. northeast of here.

†**N. J., Little Falls**—Apr. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $79,000.

N. Y., Holland Patent—Central Rural School Dist. 1, taking bids constructing general contract, plumbing, heating, electrical work for school, Trenton St. $425,500. P.W.A. project. Kinne & Frank, 7 Hopper St., Utica, archts. Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

N. Y., Newark—Apr. 22 (extended date), by Dpt. Mental Hygiene, State Office Bldg., Albany, construction, heating, sanitary and electrical work for Farm Colony Building, Newark State School. Noted Feb. 19, C. D.—Feb. 27, E. N.-R.

N. Y., Newburgh—Apr. 10, by Lower Hudson Regional Market Authority, general contract regional market, Dickson St. P.W.A. project. E. C. Smith, 39 Market St., Poughkeepsie, archt.; adv. E. N.-R., Mar. 26. Noted Feb. 7, C. D.—Feb. 13, E. N.-R.

N. Y., Pavilion—Central School Dist. bids about Apr. 5, constructing school. P.W.A. project. Bley & Lyman, 505 Delaware Ave., Buffalo, archts. Noted Mar. 9, C. D.—Mar. 12, E. N.-R.

N. Y., Peekskill—Apr. 6, by Village, W. M. Gallagher, clk., foundations and general contract, heating, plumbing, and electrical work for municipal building. $124,000. P.W.A. project; adv. E. N.-R., Mar. 26.

†**N. Y., Troy**—Apr. 6, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing freight elevator in U. S. Post Office.

N. Y., Tuckahoe — Mar. 30, by Bd. Educ. Union Free School Dist. 1, constructing brick, steel addition to Eastchester High School, plain

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Public Buildings (Continued)

found. $271,521. P.W.A. project. Tooker & Marsh, 101 Park Ave., New York, archts. Noted Oct. 10, C. D.—Oct. 17, E. N.-R.

N. Y., Walkill—Apr. 9 (extended date), by Dpt. Correction, State Office Bldg., Albany, constructing dairy farm building, at Walkill Prison. W. E. Haugaard, State Office Bldg., Albany, archt. T. F. Farrell, State Office Bldg., Albany, engr. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

†O., Dayton—Apr. 14, by Veterans Bureau, Arlington Bldg., Wash., D. C., boilers, stokers and equipment for U. S. Veterans Home.

†O., Mount Gilead—Apr. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $64,000.

†Okla., Enid—Apr. 14, by P. Wks. Administration, Div. Housing, Wash., D. C., constructing foundations of Enid Springs Park Housing Project. Project H-5401. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

Pa., Dunmore—Mar. 30, by Dunmore School Dist., F. G. Scott, secy., 2 story, brick, steel high school, at North Webster, Schwartz and Warren Sts. $300,000. P.W.A. project. J. Howley, Scranton, archt.

★ **Pa., Wilmerding**—Bd. Educ., M. D. Feree, secy., taking new bids general contract 1 and 3 story, part basement, 60x278 ft. and 120x175 ft. brick, steel school building and athletic field. Total est. $600,000. Hunter & Caldwell, archts., 5th Ave. and 36th St., Altoona, revised plans. Bids Feb. 28, rejected. Noted Mar. 4, C. D.—Feb. 20, E. N.-R.

†R. I., East Providence—Apr. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $70,000.

†Tex., Fort Sam Houston—Apr. 15, by Con. Q.M., constructing 2 sets non-commissioned officers' quarters, $35,000; utility shops and garage building, $45,000. Noted Mar. 16, C. D.—Mar. 19, E. N.-R.

Tex., Fort Worth—Apr. 2, by Fort Worth Independent School Dist., c/o E. P. Williams, bus. mgr., 409 East Weatherford St., 3 story, basement, 176x410 ft., constructing North Side Senior High School. $395,000. P.W.A. project. Wiley G. Clarkson & Co., 610 1st Natl. Bank Bldg., archt.

Tex., Galveston — State Bd. Regents taking bids brick, rein.-con., steel, crippled children's hospital building, plain found. $200,000. P.W.A. project. R. L. White, c/o Bd. Regents, Galveston, and Austin, archt. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

†Tex., Kaufman—Apr. 21, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000.

†Tex., Mineola—Apr. 21, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $83,000.

†Wash., Centralia—Apr. 22, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $98,000.

Wash., Vancouver—See "Unclassified."

†Wis., Berlin—Apr. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $72,000.

†Wis., Oconomowoc—Apr. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $80,000.

Wis., Wauwatosa—Apr. 1, by W. L. Coffey, mgr., Milwaukee Co. Institutions, furnishing, delivering, installing laundry machinery, equipment, steel lockers, shelving bins, tables, etc., in new central laundry building. P.W.A. project.

Wis., Waukesha—Apr. 13, by Bd. Educ., constructing superstructure, 3 story, 83x180 ft., brick, steel high school addition. $150,000. P.W.A. project. S. A. Snyder, 202 Roberts Ave., assoc. archt. Clas & Clas, Inc., and C. C. Reynolds, 759 North Milwaukee St., Milwaukee, archts.

CONTRACTS AWARDED

Calif., Claremont—Bd. Trustees of Pomona College, 2 story, part 3 story, rein.-con. women's dormitory, 3rd St., to Weymouth Crowell Constr. Co., 2104 East 15th St., Los Angeles, $146,400. Allison & Allison, 1014 Edison Bldg., Los Angeles, archts.

Conn., East Haven (br. New Haven)—Town, J. H. Corbett, chn. Building Comn., 78 Main St., East Haven, excavating for 2 story, basement high school, Tyler St., to C. W. Blakeslee & Sons, 58 Waverly St., New Haven. P.W.A. Noted Feb. 24, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

Conn., Madison—Smith Constr. Co., Inc., general contractors, 101 Water St., Derby, roofing for school and gymnasium, to G. R. Cummings Roofing Co., 198 State St., Meriden, for Town, Bd. Selectmen***stone, to Dextone Co., 166 Chapel St., New Haven***iron, to Builders Iron Co., 67 Winthrop Ave., New Haven***structural steel, to Berlin Structural Co., Berlin*** reinforcing steel, to Truscon Steel Co., 42 Church St., New Haven***finish, to Hartford Builders Finish Co., 34 Potter St., Hartford ***plumbing, to A. J. Mongillo, 928 Grand Ave., New Haven***heating, to Mayflower Heating Corp., 364 Asylum St., Hartford***material

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partitions, to Henry Weis Mfg. Co., Elkhart, Ind.*electrical work, to A. C. Senecal Co., P. O. Box 35, Westboro, Mass. Noted Feb. 21, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

Conn., New Britain—Michael A. Connor Co., general contractors, 15 Standish St., Hartford, tile for brick, steel Roosevelt Junior High School, to White M. Clark, Inc., 38 Ford St., Hartford, for City, J. M. Ward, chn. Bd. Educ. ***millwork, to N. B. Woodworking Co., 55 Pearl St.***wire work, to American Wire Wks., 31 Kilbourn St. Hartford. Noted Mar. 2, C. D. —Mar. 5, E. N.-R., under "Contracts Awarded."

†D. C., Wash. — Treas. Dpt. at office Sup. Archt., Wash., D. C., changes in 4th floor north wing Treasury Department building, to Harwood Nebel Constr. Co., 2539 Pennsylvania Ave., $13,698.

†Ill., Galesburg—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Holton Seelye & Co., 32 West Randolph St., Chicago, $118,524. Bids Mar. 6. Noted Mar. 10, C. D.—Feb. 20, E. N.-R.

Mass., Avon—Klayman Constr. Co., general contractors, 92 Hazelton St., Mattapan, plumbing for Gifford School additions, etc., to Larkin Eng. Co., 206 Corey Rd., Brookline, for Town, W. W. Littlefield, chn. Building Comn.***roofing, to Columbia Cornice Co., 268 Elm St., Cambridge ***painting, to R. E. McCassey, 54 Playstead Rd., Newton. Noted Mar. 2, C. D.—Mar. 5, E. N.-R. Noted Feb. 10, C. D.—Feb. 13, E. N.-R. under "Contracts Awarded."

Mass., Lawrence—C. H. Cunningham & Co., Inc., general contractors, 31 Exchange St., Lynn, iron for women's dormitory at Municipal Home, Marston St., to Lyons Iron Wks., Inc., 500 Willow St., Manchester, N. H., for City, J. J. Daley, city clk.***steel sash, to Detroit Steel Products Co., 38 Chauncy St., Boston***reinforcing steel, to Joseph T. Ryerson & Son, Inc., Third St., Cambridge***plumbing, to R. F. Hancock, 114 Woodland St., Lawrence***heating, to Florence & Co., 79 Sudbury St., Boston***cast stone, to Cambridge Cement Stone Co., 156 Lincoln St., Brighton***roofing, to Eagle Cornice & Skylight Wks., 197 Sidney St., Cambridge***painting, to Johnson-Foster Co., 69 Meacham Rd., Somerville***electrical work, to James Wilkinson & Co., 128 Oliver St., Boston***demolition, to Everett Building Wrkg. & Supply Co., Inc., 1690 Revere Beach Parkway, Everett. Noted Jan. 22, C. D.—Jan. 30 E. N.-R. under "Contracts Awarded."

Mass., Medford—City, J. J. Irwin, mayor, F.E.R.A. administrator in charge, City Hall, furnishing 125 tons structural steel for municipal garage, to New England Structural Steel Co., Everett. Noted Dec. 27, C. D.—Jan. 2, E. N.-R., under "Contracts Awarded."

†Mass., Rutland Heights—Vet. Bu., Arlington Bldg., Wash., D. C., 1 electric elevator in Building 21, to F. S. Payne Co., 75 Richdale Ave., Cambridge, $5,719. Bids Feb. 11. Noted Feb. 17, C. D.—Feb. 6, E. N.-R.

Mass., Spencer—J. W. Bishop Co., general contractor, 100 Foster St., excavation for high school, Main St., to Dooley Bros., 39 George St., Roxbury, for Town, Supt. Schools. Noted Jan. 17, C. D.—Jan. 23, E. N.-R. under "Contracts Awarded."

Minn., Minneapolis—University of Minnesota, furnishing, installing new steam generator unit, to Fuel Economy Eng. Co., 510 New York Bldg., St. Paul, $93,848. Bids Feb. 11. Noted Feb. 19, C. D.

Minn., New Ulm—City, A. C. Sannwald, clk., furnishing materials, equipment and installing municipal power plant, turbine foundation, pipe and insulation, turbine-room, cooling pond, pumps and drives, switchboard and electrical wiring, to Power Service Corp., 711 Wesley Temple Bldg., Minneapolis, $48,187. P.W.A. Bids Feb. 26. Noted Feb. 19, C. D.

★ **Mo., Excelsior Springs**—City, constructing mineral water building, native stone, steel, for dispensing spring waters for baths and drinking, to McDonald Constr. Co., 3826 Pine Blvd., St. Louis, $437,136. P.W.A. Bids Mar. 11. Noted Mar. 17, C. D.—Feb. 27, E. N.-R.

Neb., Wood Lake—City, furnishing, installing cooling system addition, roof structure addition and utilization equipment for light plant improvements, to Fairbanks Morse & Co., 9th and Harney Sts., Omaha, $12,447. Est. $14,336. P.W.A. Bids Feb. 27. Noted Feb. 19, C. D.

N. M., Santa Fe—State Building Comn., Santa Fe, general contract supreme court building, to Edward Lembke Constr. Co., Albuquerque, $182,360***plumbing and heating, to Wood Davis Hardware Co., Santa Fe, $27,296***wiring, to Prokosh Electric Co., Santa Fe, $6,148 ***fixed equipment, to Santa Fe Book & Stationery Co., Santa Fe, $15,573***vault lining and doors, to Herring-Marvin-Hall Safe Co., Grand Blvd., Hamilton, O., $2,829***elevators, to Otis Elevator Co., 1822 Young St., Dallas, Tex., $6,360. Grand total $234,317. Est. $229,000. P.W.A. Bids Feb. 21. Noted Feb. 27, C. D.—Feb. 13, E. N.-R.

N. Y., Brooklyn—W. Kennedy Constr. Co., general contractors, 215 Montague St., 500 tons structural steel for library for Brooklyn College, to Lehigh Structural Steel Co., Allentown, Pa., for Bd. Higher Educ., Brooklyn College, 383 Pearl St. Noted Dec. 12, C. D.—Dec. 19, E. N.-R., under "Contracts Awarded."

N. Y., Hogansburg—State Dpt. Educ., State Office Bldg., Albany, general contract school at St. Regis Indian School, to DeRiso Bros., Inc., 410 Bergenline Ave., West New York, N. J. General contractor awarded contract structural steel for same, to Utica Structural Steel Corp., 2104 Dwyer Ave., Utica***excavation, to R. Primo, Hogansburg***heating, to E. W. Tompkins Co., 22 Market St., Albany. P.W.A. Noted Feb. 4, C. D., under "Contracts Awarded."

★ **N. Y., Rochester**—City, City Hall, general contract central fire headquarters, University St., to Stewart & Bennett, Inc., 126 North Water St.***plumbing, to M. W. Utz, 1059 East Main St.***heating, to Lothar C. Gresens, 32 Silver St.***electrical work, to Vanderlinde Electric Corp., 52 Charlotte St.***elevator, to Graves Elevator Co., 280 Lyell Ave. Est. $406,000. P.W.A. Noted Feb. 7, C. D.—Feb. 13, E. N.-R.

N. Y., Schoharie—Bd. Supervs. Schoharie Co., general contract county jail, rear of court house, to A. Panzieri, Inc., Terminal St., Albany*** heating and plumbing, to Levi Case & Co., 412 Warren St., Schenectady***electrical work, to J. J. Kennedy, 659 Bway., Albany***jail equipment, to Fries & Son Eng. & Constr. Co., Covington, Ky. P.W.A. Noted Feb. 25, C. D.—Feb. 13, E. N.-R.

O., Batavia — City, heating and ventilating, also plumbing and gas fittings for school, to T. J. Connors, Inc., Cincinnati, $11,955 and $4,795 respectively. P.W.A. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

O., Bethel—Village, electrical work for school, to Fogarty Electric Co., 946 Blair St., Cincinnati, $1,461***plumbing, to R. P. Youngman, Bethel, $3,193***flooring, to Durbrow & Otte, 206 West Court St., Cincinnati, $1,482. Grand total $6,136. P.W.A. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Pa., Berlin—Consolidated Borough of Berlin, Twp. of Brothers Valley Bd. Educ., Berlin and Somerset, general contract 2 story, basement, 60x321 ft., brick, steel school, Brothers Valley, to Somerset Lumber Co., Somerset***electrical work, to D. R. Ross Electric Co., 435 Clokey Ave., Mt. Lebanon***plumbing, to Wm. M. Clark & Co., 295 South Beaver St., New Castle***heating, to Windber Plumbing & Supply Co., Windber. Bids Dec. 9. Noted Dec. 27, C. D.—Oct. 31, E. N.-R.

R. I., Burrillville—State, Emergency P. Wks. Comn., State House, Providence, heating for children's building at Wallum Lake Sanatorium, to Taylor Heating Co., 714 Broad St., Providence, $3,448***plumbing, to Raoul Renard Plumbing & Heating Co., 284 Elm St., rear of 56 Cumberland St., Woonsocket, $9,500***electrical work, to Stanford Electric Constr. Co., 4 Westminster St., Providence, $3,800. Grand total $16,748. P.W.A. Bids Jan. 28, awarded Mar. 12. Noted Feb. 4, C. D.—Jan. 23, E. N.-R.

R. I., Howard (Cranston)—Dimeo Constr. Co., general contractor, 75 Westminster St., Providence, painting dairy barn at State Hospital, to G. L. Paquette Co., 2 Cole St., Seekonk, Mass., for State Emergency P. Wks. Comn., Providence ***roofing, to Providence Cornice Co., 309 Canal St., Providence***terrazzo, to New England Marble Co., Inc., 268 Hartford Ave., Providence ***heating and plumbing, to Frank Dupuis Co., 599 Main St., Pawtucket***electrical work, to Scannevin & Potter, 189 Pine St., Providence*** excavation, to A. Gonnelli, 454 Admiral St., Providence***plastering, to H. Carr & Sons, Inc., 75 Westminster St., Providence***building finish, to L. Vaughn Co., 1153 Westminster St., Providence. P.W.A. Noted Feb. 4, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

R. I., Howard (Cranston) — Dimeo Constr. Co., general contractors, 75 Westminster St., Providence, excavating for laundry and mechanics building at State Infirmary, to A. Gonnelli, 454 Admiral St., Providence, for State, Emergency P. Wks. Comn., Providence***building finish, to Pawtucket Sash & Blind Co., 22 Mason St., Pawtucket***stone and granite, to Alex Thomson, Inc., Allens Ave., Providence ***roofing, to Providence Cornice Co., 309 Canal St., Providence***painting, to G. L. Paquette Co., 2 Cole St., Seekonk, Mass. P.W.A. Noted Feb. 4, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., State House, Providence, 2 story, basement, tubercular building at State Hospital, to New England Concrete Co., 381 Promenade St., Providence, approximately $125,000***heating, to Files Engrg. Co., 31 Bourn St., Providence, $6,975***plumbing, to R. Renard, 284 Elm St., Woonsocket, $10,250*** electrical work, to Stanford Electric Constr. Co., 4 Westminster St., Providence, $6,780. Grand total $149,005. Bids Feb. 10 (refigures). Noted Feb. 19, C. D.—Jan. 30, E. N.-R.

S. C., Columbia — State of South Carolina Hospital for Insane, F. Williams, supt., constructing new psychopathic building to J. A. Jones Constr. Co., Commercial Bank Bldg., Charlotte, $324,190. P.W.A.

S. C., State Park—State Bd. Health, Columbia, constructing (1st unit) State Park Tuberculosis Sanatarium, to J. J. McDevitt Constr. Co., Builders Bldg., Charlotte, N. C., $64,612. Noted Mar. 11, C. D.

†Va., Quantico—Yards & Docks, Navy Dpt., Wash., D. C., improving bachelors' quarters at Marine Barracks, Spec. 8080, to H. A. Spiegler Co., 320 5th Ave., New York, N. Y., $24,568 (120 days). Bids Mar. 11. Noted Mar. 13, C. D.

†Federal Government.

Public Buildings (Continued)

†**Wyo., Cheyenne**—Treas. Dpt. at office Sup. Archt., Wash., D. C., new roofing on U. S. Post Office, to H. L. Grohne, 2594 North Water St., Decatur, Ill., $14,430.

†**T. H., Pearl Harbor**—P. Wks. Officer, Pearl Harbor, constructing quarters at fleet air base, to Pioneer Constr. Co., Lloyd Bldg., Seattle, Wash., $307,000. Bids Mar. 11. Noted Feb. 24. C. D.—Feb. 27, E. N.-R.

COMMERCIAL BUILDINGS

PROPOSED WORK

★ **Calif., Los Angeles**—Jay Paley, c/o E. F. Hutton & Co., 6619 Hollywood Blvd., Hollywood, plans by P. Williams, 3839 Wilshire Blvd., apartment hotel, Sunset Blvd., at south city limits of Beverly Hills. $2,000,000.

Calif., West Los Angeles—Mar. 21, by Twentieth Century Fox Film Co., 10260 Orton Ave., 3 story, 90x280 ft., rein.-con. property storage building, $250,000; bids about Mar. 21, general contract 3 story, 85x102 ft. office building, $350,000. J. A. Barlow, 10260 Orton Ave., engr. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

Conn., Meriden—St. Mary's Roman Catholic Parish, F. J. Sprafke, chn. Building Comn., plans by G. Zunner, brick, stone parochial school, convent and parish house, Grove St. $140,000.

Conn., New Milford — Canterbury Catholic School for Boys, New Milford, plans school and administration building. Est. about $140,000. Architect not appointed.

Idaho, Idaho Falls—Rogers Building, Idaho Falls, plans rebuilding 2 story office and store building, damaged by fire. Est. about $150,000. **Maturity indefinite.** Architect not appointed.

La., New Orleans—Mar. 20, by W. B. Moses and L. Weil, 427 South Peters St., engrs., installing complete air conditioning system in 2 story building for Kreeger Store. Est. $20,000.

Md., Bel Air—Bel Air Presbyterian Church plans church. Est. about $150,000. **Maturity indefinite.** Architect not appointed.

Md., Crownsville—Crownsville State Hospital plans staff building. $140,000. Maturity dependent upon allocation of funds. Architect not appointed.

Mich., Kalamazoo—St. Marys Parish plans being completed by A. Des Rosiers, 1414 Maccobee Bldg., Detroit, 2 story, 60x90 ft., brick, stone school and church building.

Mich., Muskegon—Occidental Hotel Co., Occidental Hotel, plans store and hotel. To exceed $140,000. **Maturity indefinite.** Architect not appointed.

Minn., Minneapolis — Owner, c/o Larson & McLaren, archts., 400 Roanoke Bldg., sketches constructing 4 story, rein.-con., brick, stone and refacing adjoining store building, 701 Nicollet Ave. $200,000. F. W. Woolworth Co., H. C. Weaver, 854 Builders Exch. Bldg., dist. constr. office, lessee.

Minn., Minneapolis—Westminster Presbyterian Church, T. F. Wallace, chn. Building Comn., 115 South 4th St., plans by Magney & Tusler, 104 South 9th St., parish house and chapel addition, 12th St. near Nicollet Ave. $225,000.

Mo., Cape Girardeau—Berberich Hotels, Inc., c/o W. Berberich, pres., 1734 Washington Ave., soon lets contract 5 story, basement, 37x31 ft., rein.-con., brick, steel, terra cotta addition to Marquette Hotel, Bway. and Foundation St. C. A. Koerner, 1601 Syndicate Trust Bldg., St. Louis, engr.

Mont., Hamilton—Valley Merchantite Building Co., Hamilton, plans constructing office and store. $140,000. **Maturity indefinite.** Architect not appointed.

N. Y., Baldwin—Sprague Estates Builders, Inc., plans constructing group 100 additional dwellings, North Grand Ave. and Sprague St. To exceed $400,000.

N. Y., Bayside—Corporation, c/o I. J. Rose, 1805 Avenue N, Brooklyn, plans by S. M. Sterling, c/o owner, constructing group of 40 dwellings, Cross Island Blvd. and 38th Ave. To exceed $140,000.

N. Y., Bellerose—Bellerose Housing Corp., 163-18 Jamaica Ave., Jamaica, plans by F. J. Burmeister, 155-31 Jamaica Ave., constructing group 40 or more frame dwellings, 251st St. and 87th Dr. $140,000.

N. Y., Binghamton—City, C. A. Harrell, mgr., City Hall, plans replacing present city hospital with modern structure, Mitchell St. To exceed $140,000. Architect and engineer not appointed.

N. Y., Brooklyn—H. Greenspan, 6324 24th Ave., plans by J. J. Millman, 184 Joralemon St., 6 story, brick apartment, plain found., 780 East 17th St.

N. Y., Brooklyn—Corporation, c/o J. Zager, 1470 Troy Ave., plans by S. Casterson, c/o owner, constructing group 1 story, brick dwellings, Glenwood Rd. and 54th St. $140,000.

N. Y., Brooklyn—A. Ferranti, 831 Albany Ave., plans by H. A. Weinstein, c/o owner, group 1 story, brick dwellings, 1200 East 49th St. $140,000.

†*Federal Government.*

N. Y., Brooklyn — P. Rinella, 831 Albany Ave., plans by H. A. Weinstein, c/o owner constructing group 1 story, brick dwellings, 662 East 51st St. $140,000.

N. Y., Douglaston—United Associates, 245th St. and Northern Blvd., plans constructing group 2 story, brick, stone dwellings, vicinity of 245th St. and Northern Blvd. To exceed $150,000.

N. Y., Elmhurst—Prosperty Homes Development, 829 Astoria Blvd., Long Island City, plans by Wuest & Bailey, 32-03 30th Ave., Long Island City, constructing group frame dwellings, 24th Ave. and 96th St. $140,000.

N. Y., Flushing—Friendship Homes, Inc., 150 West 55th St., New York, plans by E. Fels, c/o owner, constructing group 2 story, frame dwellings, 166th St. and Franconia Ave. $140,000.

N. Y., Flushing—Manor Homes, Inc., 369 Lexington Ave., plans by J. Unger, Main St., group 2 story, frame buildings, 25th Dr. and 166th St. $140,000.

N. Y., Flushing—Manchester Homes, Flushing Manor, plans constructing (3rd development), group 25 brick, frame dwellings, Flushing Manor. $140,000. Private plans.

N. Y., Flushing — Prosperity Homes, 40-09 82nd St., Jackson Heights, plans by A. E. Allen, Garden City, constructing (3rd unit), group 2 frame dwellings, 45th Rd. near 192nd St. $140,000.

N. Y., Great Neck—Lewis & Valentine Co., Little Neck, plans residential development on 60 lots, in Great Neck Gardens. To exceed $140,000.

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These construction news items are published daily in the McGraw-Hill *Construction Daily* and sent to *Daily* subscribers each evening by first-class or air mail. In addition low bidders are reported immediately after bids are opened and often some days or weeks before the contract is awarded. Subscription rate, $10 per month. $1 additional for air mail. Samples on request. Business News Department, *Engineering News-Record*, 330 West 42nd St., New York, N. Y.

N. Y., Hollis—Goldmack Realty Co., 104-22 116th St., Richmond Hill, plans by J. E. Cahill, 89-64 163rd St., Jamaica, constructing group 1 story, frame dwellings, Illion Ave., Wood St. and vicinity. $140,000.

N. Y., Kew Gardens—Briarwood Estates, 69-50 Ingram St., Forest Hills, plans constructing 100 frame dwellings, Grand Central Parkway. To exceed $350,000.

N. Y., Mineola—Mott Bros., Old County Rd., plans tract development and frame dwellings, Old Country Rd. $140,000.

N. Y., New York—Corporation, c/o Armstrong Bros., 3232 Bainbridge Ave., plans by J. M. Felson, 250 West 57th St., 6 story, brick apartment, plain found., near Loring Pl. and Sedgwick Ave. $200,000.

N. Y., New York—Gefree Realty Corp., c/o S. L. Strauss, 41 Union Sq., constructing 6 story apartment, 310 East 75th St. To exceed $150,000.

N. Y., New York—Seamans Bank for Savings, 74 Wall St., plans by J. M. Berlinger, 17 East 49th St., altering heating and plumbing in apartment, 2093 Third Ave. $37,000 with equipment.

N. Y., New York—Two Thousand Sixty-Five University Avenue Realty Corp., J. Marker, 535 5th Ave., plans by J. N. Felson, 250 West 57th St., constructing 6 story, brick apartment, plain found, University Ave. near 183rd St. $175,000.

N. Y., Niagara Falls—St. John De La Salle Church and School, 8469 Buffalo Ave., plans constructing parochial school and church, 8469 Buffalo Ave. Architect and engineer not appointed.

N. Y., Roslyn—North Hempstead Homes, Inc., c/o E. H. Orton, Oakland Dr., Port Washington, plans constructing frame dwellings and tract development on 15 acre site. $140,000. Site acquired.

N. Y., St. Albans—Ben Reines and S. Berman, 203rd St. near Linden Park, plans constructing group frame dwellings, 203rd St. near Linden Park. To exceed $140,000. Private plans.

N. Y., Syracuse—St. Anthony of Padua Roman Catholic Church, 1605 Midland Ave., bids late in April, constructing parochial school, West Colvin St. To exceed $140,000. P. Hueber, 212 Harrison St., archt.

N. Y., Tonawanda—Mount St. Mary's Roman Catholic Academy, Delaware Ave., plans completed by M. J. Murphy, Curtiss Bldg., Buffalo.

N. Y., Utica—Commercial Travelers Mutual Accident Assn., 70 Genesee St., bids early in April, 5 story, basement, 60x100 ft. office building, 70 Genesee St. $150,000. Gouge & Ames, 70 Genesee St., archts. Noted Oct. 7, C. D.—Oct. 10, E. N.-R.

★ **N. Y., White Plains**—Corporation, c/o F. J. Helmle, Jr., 2 Vermont Ave., plans 6 story office, Court St., Martine and Mamaroneck Aves. $1,000,000. Negotiations for site in progress.

N. Y., Woodside—Hub Homes, Inc., 63rd St. and Queens Blvd., plans constructing group frame dwellings, vicinity of 63rd St. near Queens Blvd. $140,000 or more.

O., Cleveland—North Moreland Co., c/o Bernstein, Society for Savings Bldg., plans being completed by J. H. Graham, Hanna Bldg., 3 story, basement, 36 suite, brick, steel apartment, North Moreland Blvd. and Kemper Rd. $150,000.

★ **O., Cincinnati**—Ring Constr. Co., Wilson Blvd. and Mt. Vernon, Rosslyn, Va., Wash., D. C., plans by Schwartz Bros., Kieth Bldg., constructing ninety 2 story basement apartment buildings, to be called "Colonial Homes of Ohio," on 38 acres site, Central Parkway. $3,000,000.

Pa., Allentown—Hess Bros., 9th and Hamilton Sts., plans modernizing department store at 9th and Hamilton Sts., both 5 story main building and 8 story annex to include new store front, display counters, interior equipment, etc. $150,000. **Maturity soon.**

Pa., New Castle—J. F. Genkinger, 1004 Butler St., plans by V. A. Rigamount, 87 Vandergrift Bldg., Pittsburgh, 3 story, basement, 90x160 ft., brick, steel, concrete theatre, 1,500 seating capacity, with dressing rooms and stage pit, and store building.

Que., Montreal — L. J. Beaudoin Ltd., 4691 Queen Mary Rd., plans by C. M. D'Allemagne, 1430 Bleury St., constructing 48 suite concrete, brick apartment house, Cote St. Luke Rd. $250,000.

BIDS ASKED

N. J., Teaneck—See "Contracts Awarded."

N. Y., Bayside—See "Contracts Awarded."

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., Middletown—Orange County Telephone Co. 19 John St., taking bids rein.-con., brick, steel addition to telephone exchange building, plain found., 19 John St. R. R. Graham, 25 Prospect St., archt. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

N. Y., New York—See "Contracts Awarded."

N. Y., Rye—See "Contracts Awarded."

N. Y., Scarsdale—See "Contracts Awarded."

★ **N. Y., Syracuse**—Syracuse University, College of Medicine, taking bids general contract plumbing, heating and electrical work for medical college, South McBride St. $825,000. P.W.A. project. Dwight James Baum and John Russell Pope, 542 5th Ave., New York, archts. Noted Feb. 4, C. D.—Feb. 6, E. N.-R.

Wis., East Troy—H. J. Gaul, archt., 228 East Superior St., Chicago, Ill., taking bids 2 story, basement, 60x100 ft., brick, rein.-con., steel novitiate, plain found, for Society of The Divine Word, Teching, Ill.

CONTRACTS AWARDED

Calif., San Francisco—Roos Bros., Stockton and Market Sts., Class A brick, steel, concrete store additions and reconstruction, Stockton and Market Sts., to Lindgren & Swinerton, 225 Bush St., $165,000. Awarded Mar. 16. Bliss & Fairweather, Balboa Bldg., and A. R. Williams, Humboldt Bank Bldg., archts.

Conn., Bridgesport—Hewlett Co., general contractors, 1385 Iranistan Ave., steel for 2 story, basement, brick, stone, steel parochial school and convent units connected by enclosed passage, Colorado Ave., for St. Anthony Parish, A. A. Jalbert, Pastor, to Porcupine Co., Fairfield***bar joists, to Concrete Steel Co., 2 Park Ave., New York***plumbing and heating, to J. H. Day, 617 Fairfield Ave. Noted Mar. 6, C. D. — Mar. 12, E. N.-R., under "Contracts Awarded."

Conn., Hartford—Industrial Constr. Co., general contractors, 721 Main St., steel for 2 story, 65x155 ft., and 40x45 ft. wing, brick, limestone, granite insurance office for Caledonia Insurance Co. of Scotland, 55 Asylum St., to Topper & Griggs, 200 North Main St., West Hartford*** wrecking, to N. Y. and Hartford House Wrecking Co., 619 Windsor St.***granite, to Providence Granite Co., Providence, R. I. Noted Feb. 25, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

Md., Baltimore—Belvidere Hotel Co., Charles and Chase Sts., general renovating and modernizing hotel, to Consolidated Eng. Co., 20 East Franklin St.; elevators, to Otis Elevator Co.,

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Commercial Buildings (Continued)

120 South Paca St. Est. $300,000. Noted Feb. 20, C. D.—Feb. 27, E. N.-R.

Mass., Quincy — Bethlehem Ship Building Corp., East Howard St., Quincy Point, general contract 4 story, 46x74 ft., 35x41 ft., brick, stucco, steel office building East Howard St., to J. M. and J. C. Buckley Co., 120 Tremont St., Boston. Est. $140,000. Bids Mar. 11, awarded Mar. 16. Noted Mar. 5, C. D.—Mar. 12, E. N.-R.

Mich., Detroit—Michigan Bell Telephone Co., Cass Ave. 4 story, basement, brick, steel stone, telephone exchange, plain found., Grand River, to A. A. Albrecht Co., 1201 Penebscot Bldg. Est. $150,000. Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

N. J., Teaneck—Capitol Homes, Inc., Teaneck Rd., group of 35 dwellings, Teaneck Rd., separate contracts and day labor. $140,000 or more.

N. Y., Bayside—Gross Morton Corp., Bayside Hills, constructing additional unit 146 dwellings, Bayside Hills, separate contracts and day labor. $410,000. A. E. Allen, Garden City, archt.

★ **N. Y., Brighton**—Toschrist Builders, c/o F. P. Tosch, Rochester, 70 residences on Theodore Quandt farm between Edgewood Ave. and Westfall Rd., off Monroe Ave., incl. paving, pipe lines and electric lines. Owner builds. Owner will purchase material. $500,000. **Maturity in April.**

N. Y., Brooklyn — Fine Homes, Inc., 153 Pierrepont St., constructing group brick dwellings, Kings Highway near Dahill Rd., day labor and separate contracts. $150,000. Seelig & Finkelstein, 153 Pierrepont St., archts.

N. Y., Brooklyn — Carroll-Eighth Holding Corp., S. Morsseiff, in charge, 99 Wall St., New York, constructing 11 story, brick, steel apartment, plain found., 8th Ave. and Carroll St., separate contracts. $400,000. M. E. Ungarleider, 191 Joralemon St., archt. Noted Feb. 21, C. D.—Feb. 27, E. N.-R.

N. Y., Brooklyn—Monden Realty Corp., H. Heringman, pres., 26 Court St., constructing 6 story, brick apartment, plain found., Kings Highway, separate contracts now being awarded. Noted Feb. 20, C. D.—Feb. 27, E. N.-R.

★ **N. Y., Brooklyn** — Ninety-Nine Lafayette Avenue Corp., 90 Lafayette Ave., constructing 10 story apartment, 93 Lafayette Ave., to Patrick Constr. Co., 464 5th Ave. Est. exceeds $400,000.

N. Y., Garden City—Mott Bros., Survey Lane, Hempstead, group of brick dwellings and tract development, incl. sidewalks, sewers, roads, etc. Washington Ave., separate contracts awarded. To exceed $140,000.

N. Y., New York — Milruth Realty Corp., 2734 Jerome Ave., constructing 6 story apartment, 202nd St. and Grand Concourse, separate contracts now being awarded. $140,000. Bates & Heindsmann, 2526 Webster Ave., archts. Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

N. Y., New York—Esdo Realty Corp., H. H. Minskoff, pres., 52 5th Ave., 6 story store and apartment, 167th St. and Grant Ave., separate contracts now being awarded. $175,000. H. Ginsbern, 205 East 42nd St., archt. Noted Feb. 21, C. D.—Feb. 27, E. N.-R.

N. Y., New York—Inwood Apartments, Inc., c/o Goodman & Mabel, 1450 Bway., 6 story, brick, steel apartment, plain found., 62 Cooper St., separate contracts. To exceed $150,000. G. Miller, 40 East 49th St., archt. Noted Feb. 21, C. D.—Feb. 27, E. N.-R.

N. Y., New York—Jarsch Realty Corp., 313 East Houston St., altering heating and plumbing in three 5 story apartments, 59 Suffolk St., to Wald Constr. Co., 59 Suffolk St. $40,000 with fixtures. Noted Feb. 20, C. D.—Feb. 27, E. N.-R.

N. Y., New York—Story Realty Corp., 2320 Westchester Ave., 4 story, brick apartment, plain found., Gleason and Castle Hill Aves., separate contracts. $140,000. I. L. Crausman, 332 East 149th St., archt. Noted Feb. 26, C. D.—Mar. 5, E. N.-R.

N. Y., New York—Onward Construction Co., 41 Broad St., altering heating, plumbing for 17 story apartment, 247 West 73rd St., by day labor and separate contracts. $37,000 with fixtures. Scacchetti & Siegel, 1860 Bway., archts.

N. Y., Rye—Soocren Corp., 429 West 117th St., New York, constructing residential development, Grace Church St., separate contracts. $140,000 or more. Private plans. Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

N. Y., Scarsdale—H. Van Buskirk, 141 Parkway Rd., Bronxville, constructing group of dwellings, Oak Hill Park, day labor and separate contracts. To exceed $150,000. Private plans. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

N. Y., Woodside — Wynwood Homes, Inc., 179-26 Anderson Rd., St. Albans, constructing group 2 story, dwellings, 51st Ave. and 61st St., separate contracts now being awarded. $275,000. A. E. Allen, Garden City, archt. Noted Feb. 20, C. D.—Feb. 27, E. N.-R.

Pa., Bellevue—Bellevue Arms Corp., c/o M. Nirdlinger, archt., Empire Bldg., Pittsburgh, 5 story, basement and sub-basement, 60x220 ft., brick, steel, tile apartment building, incl. parking garage, dining room and roof garden, 3 automatic elevators, Lincoln Ave., to W. T. Const. Co., Keenan Bldg., Pittsburgh. Est. $250,000.

Tenn., Nashville—Sears Roebuck & Co., State and Van Buren Sts., Chicago, Ill., air conditioning system in department store, to York Ice Mchy. Co., York, Pa. Est. $50,000. Noted Oct. 29, C. D.—Oct. 31, E. N.-R.

Tex., Dallas—Ford Motor Co., Dearborn, Mich., structural steel and steel erection for exhibition building for Texas Centennial, to Mosher Steel Co., 5101 Maple St. Noted Feb. 17, C. D.—Feb. 20, E. N.-R., under "Contracts Awarded."

Ont., Ottawa—Henri Blackburn, 294 St. Joseph Blvd., Hull, Que., constructing rein.-con., brick apartment, plain found., Somerset St. W., to Edgar Proulx & Co. Ltd., 621 St. Patrick St. Est. $140,000-$150,000.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ala., Huntsville—WAREHOUSE—Huntsville Warehouse Co. plans storage and warehouse. $50,000. **Maturity indefinite.** Architect not appointed.

Calif., Los Angeles — MARKET — Ralph's Grocery Co., 926 West 7th St., plans by Morgan, Wall & Clements, 1135 Van Nuys Bldg., 1 story, mezzanine, 120x150 ft., rein.-con. market, etc., Figueroa St. and Vernon Ave. To exceed $37,500.

Calif., Los Angeles—INDUSTRIAL—Owner, c/o P. Kingsbury, archt., 803 West 3rd St., making plans 2 story, 80x160 ft., industrial building. To exceed $37,500. S. Barnes, 803 West 3rd St., engr.

Calif., Sacramento — BREWERY — Buffalo Brewing Co., 21st and R Sts., plans fireproof brewery additions, incl. new bottle soaker, bottle crowner, etc. $50,000 or more. Architect not appointed.

Colo., Canon City — PLANT — Consolidated Feldspar Corp., Baltimore, Md., plans feldspar crushing and treating plant, First and Water Sts. $100,000. Site secured.

Colo., Climax—PLANT—Climax-Molybdenum Co., Climax, plans by G. M. Musick, 204 Republic Bldg., Denver, 165 room extension to workmen's quarters, recreation building, mine and mill change houses, hospital building, office building and assay office. $300,000. Noted Sept. 18, C. D.—Sept. 26, E. N.-R.

Colo., Denver—GRAIN ELEVATOR—Nebraska Consolidated Mills, 1521 North 16th St., Omaha, Neb., plans by Horner & Wyatt, Kansas City, Mo., 6 story high, rein.-con. grain elevator. $350,000.

Conn., Danbury—FACTORY—Neumann-Endlr, Inc., Industrial Corp. Odd Fellows Bldg., plans by E. Watson, Pershing Bldg., Danbury, 2 story, 61x82 ft., brick, steel factory addition. Power St. $37,000.

Conn., New Haven—WAREHOUSE—P. Ballantine & Co., Inc., Newark, N. J., plans by J. S. Shanley, 33 Washington St., Newark, N. J., 1 story, 62x151 ft. brick, steel, concrete beer distributing warehouse. $40,000.

Conn., Portland—GARAGE—Valley Oil Co., Bridge St., Middletown, plans by G. L. Dunkelberger, 44 Walcott Hill Rd., Wethersfield, 1 story, 70x120 ft. and 2 story, 35x70 ft., brick, steel garage and office units, at oil terminal plant, Brownestone Ave. $40,000.

Del., Wilmington—POWER PLANT—Ludlow Mfg. Assoc., Ludlow, Mass., soon lets contract 1 story, 75x74 ft., brick, structural steel power plant. Chas. T. Main, Inc., 201 Devonshire St., Boston, Mass., engrs.

D. C., Wash.—STORAGE—Hecht Co., F and 7th Sts., bids early in June, constructing storage building. $100,000 or more. Abbott Merket & Co., 22 East 40th St., New York, engrs. and archts. Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

Ill., Bradley—METAL STAMPING PLANT—J. H. Watson Co., Bradley, plans metal stamping plant. $50,000.

Ind., Alexandria—PLANT—Alexandria Products Co., Alexandria, plans altering and repairing plant. Est. about $37,000. **Maturity indefinite.** Architect not appointed.

Ind., Fort Wayne — WAREHOUSE, etc. — Kroger Grocery & Baking Co., Cincinnati, O., plans warehouse and distribution building. To exceed $40,000.

Ind., Indianapolis — PLANT — American Can Co., M. Pries, in charge, 230 Park Ave., New York City, plans plant, South East St. and Belt R.R. $150,000. Private plans.

Ind., Portland—GRAIN ELEVATOR—Haynes Milling Co. plans constructing 6 story grain elevator and machinery, steel, concrete. A. Springer, Fort Wayne, engr.

Ind., Shelbyville—BOTTLING PLANT—Coco Cola Bottling Co., c/o A. E. Rehme and Clara Miller, Shelbyville, plans bottling plant, North Harrison St. $37,000 with equipment.

Mich., Bay City — WAREHOUSE — Jennison Hardware Co. plans by J. P. Godeyne, Bay City, addition to steel warehouse. $40,000.

Mich., Detroit—BUS TERMINAL—Eastern Michigan System, 328 Bates St., plans by Pheips & Bernardi, 920 Detroit Savings Bank Bldg., 2 story, basement, brick, rein.-con., steel Union Bus Terminal, plain found., Washington Blvd. $200,000.

Miss., Fannin—PLANT—Know Glass & Bottle Mfg. Co. plans repairs and alterations to plant. $40,000 or more. Architect not appointed.

N. Y., Brooklyn—SERVICE GARAGE—J. Day, Inc., 67 Liberty St., New York, plans by Lama & Proskauer, 383 Jay St., 2 story, 100x100 ft. service garage, 40-48 11th St. $40,000.

N. Y., Brooklyn—BREWERY—Empire City Brewing Co., Johnson Ave., will not alter brewery, Johnson Ave. To exceed $40,000. Project abandoned.

N. Y., Brooklyn — BREWERY — Old Dutch Brewery, Inc., 783 East 42nd St., plans by G. Goldman, 50 Court St., brewery extensions, 761 East 42nd St. $37,000 with equipment.

N. Y., Brooklyn—GARAGE, etc.—Land H Holding Corp., 783 East 42nd St., plans by G. Goldman, 50 Court St., 1 story, 100x100 ft. brick garage, 757 East 43rd St. Est. about $37,000 with equipment.

N. Y., Brooklyn—Robins Dry Dock Co., Erie Basin, plans repairing fire damaged dry dock plant, Erie Basin. To exceed $40,000. Architect not appointed.

N. Y., Lakeville—SALT FACTORY—Leroy Salt Co., Main St., plans salt factory. $150,000. J. Graham Onondaga Hotel, Syracuse, engr.

N. Y., New York—STORAGE, etc.—G. Cardarelli & Co., 205 West Houston St., plans by M. H. Belkin, c/o owner, storage, furniture refinishing and showroom building, 195 West Houston St. To exceed $50,000.

N. Y., Niagara Falls—PLANT—Niagara Alkali Co., 4205 Buffalo Ave., soon lets contract installing 2 boilers, constructing pump house, water piping, sheet piling, etc., at plant, 4,203 Buffalo Ave., Jenks & Ballou, 2600 New Industrial Trust Bldg., Providence, R. I., engrs. and archts. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

N. Y., Richmond Hill—STORAGE, etc.—A. L. Reed, c/o W. E. Hadler, 107-10 103rd St., Ozone Park, plans 2 story, brick storage, display and work rooms, Jamaica Ave. near 121st St. Est. about $40,000 with equipment. Private plans.

N. Y., Rochester — BREWERY — Cataract Brewing Co., 11 Cataract St., plans rebuilding grain bin, and upper floor of building for brewery, 11 Cataract St. Est. about $37,000. Architect and engineer not appointed.

N. Y., Rochester — GARAGE — New York State Railways, Union Depot, Utica, plans garage. $175,000. Engineer and architect not appointed.

N. Y., Woodhaven—GARAGE, etc.—D. Brown Co., 53-12 New Utrecht Ave., Brooklyn, plans by A. Farber, 105 Court St., Brooklyn, 2 story, 100x100 ft., brick garage and storage, 101st Ave. and 105th St. $37,000 with equipment.

N. C., Charlotte—BREWERY—Atlantic Ice & Bottling Co., 247 Courland St. N.E., Atlanta, Ga., plans brewery. $75,000. Architect not appointed.

N. C., Hatteras—POWER PLANT—Hatteras Development Co., plans electric power plant. To exceed $40,000. **Maturity indefinite.**

O., Cleveland — PLANT — Lees-Bradner Co. (gear cutting), 6210 Carnegie St., plans plant, at East 131st St. and Taft Ave. Site purchased. To exceed $37,000. **Maturity indefinite.**

O., Columbus — BOILER PLANT — Kroger Grocery & Baking Co., 35 East 7th St., Cincinnati, making plans enlarging present plant adding auxiliary equipment, resetting boilers, installing fuel equipment, pumps, etc. $90,000. A. M. Kinney, Carew Tower, Cincinnati, engr.

O., New Philadelphia — MILL — Tuscarawas Metals, Inc., Dover, plans altering and reconditioning former mill of American Sheet & Tin Plate Co. To exceed $37,000.

Ore., Ashland — MILL — Lost Lake Lumber Co., A. W. Moon, in charge, plans planing and lumber mill. Est. about $37,000.

Pa., Kane—POWER PLANT—Kane Power Co. plans repairs and reconstruction of electric power plant. $55,000.

Pa., Mahoningtown — DAIRY — Lingerlight Dairy Co., 6 West Madison Ave., plans nearing completion by McCormick Co., Inc., 121 South Negley Ave., Pittsburgh, 1 story, basement, 40x80 ft., brick, steel dairy building, Liberty and Madison Sts.

Tenn., Memphis—PLANT—Globe Union Mfg. Co., 900 East Keefe Ave., Milwaukee, Wis., plans by J. T. Wallace, archt. and engr., Commerce Title Bldg., plant. $60,000.

Washington and Idaho—SERVICE STATIONS—Standard Stations, Inc., 729 Second St., Spokane, Wash., plans new brick, steel service stations in Cle Elum and Pasco, Wash., Pocatello, Twin Falls, Wallace and Coeur D'Alene, Idaho, during 1936. Est. $84,000. G. B. Lubeck, 729 Second St., Spokane, Wash., engr.

†*Federal Government.*

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Industrial Buildings (Continued)

Wash., Bellingham—BREWERY—Corp., c/o E. L. Stowe, plans brewery, Eldridge Dist. To exceed $60,000. Site acquired.

Wis., Green Bay—BREWERY—Otto Rahr, c/o Rahr Realty Co., plans new brewery. To exceed $75,000.

Wyo., Worland—OIL REFINERY—Yale Oil Corp. plans constructing 1,000 bbl. daily capacity oil refinery.

Alta., Red Deer—PLANT—Central Alberta Dairy Pool, A. Adrian, mgr., plans condensing plant. $100,000. Interested in equipment prices.

N. C., Burlington — MILL — R. D. Wilson, Burlington, plans hosiery plant, 10,000 ft. floor space. $150,000.

N. C., Lumberton—WAREHOUSE—Lumberton Investment Co., R. C. Adams, pres., plans large tobacco warehouse before opening of tobacco season. $40,000.

N. B., St. Johns—PLANT—Canadian Veneers Ltd., Coldbrook Park, plans plant, Coldbrook Park. To exceed $50,000. $150,000 fire loss. **Maturity indefinite.** Architect not appointed.

N. B., Woodstock—CANNING FACTORY—Syndicate, c/o R. O. Hall, Bd. Trade, plans canning factory. $40,000.

Ont., St. Catharines — Canadian Dpt. Store, c/o T. Eaton Co., St. Paul St., plans constructing department store and storage. Est. about $150,000. **Maturity indefinite.** Architect not appointed.

Ont., Toronto—WAREHOUSE—N. A. Armstrong, 19 Melinda St., archt., soon takes bids 3 story, brick, steel wholesale warehouse, plain found., Broadvie wAve., for United Drug Co., Ltd., 68 Broadview Ave. $60,000.

BIDS ASKED

Calif., Woodland—SUGAR REFINERY—See "Contracts Awarded."

Conn., Waterbury — PLANT — White Welding Co., C. Gallo, pres., North Elm St., taking bids 2 story, 40x120 ft., brick, steel, concrete welding plant addition, $37,000. A. B. Fucito, 411 Washington St., archt.

Fla., Fort Meade—PLANT—See "Contracts Awarded."

Mich., River Rouge—GAS HOLDER—Shreve, Anderson & Walker, engrs., 857 Book Bldg., Detroit, bids about Mar. 30, constructing concrete foundation for 10,000,000 cu.ft. welded steel gas container, for Ford Motor Co., Dearborn.

N. Y., Buffalo—BOILER HOUSE, etc.—See "Contracts Awarded."

N. Y., Johnson City—FACTORY—See "Contracts Awarded."

★ **N. Y., Menands** — PLANT—Montgomery Ward & Co., West Chicago Ave. and North Larr Sts., Chicago, Ill., taking bids millwork, acoustical treatment, metal lathing and plastering, structural steel, roofing, sheet metal work and transite bridge covering for mail order building, 150 North Bway. $500,000. R. R. Rowe, 619 West Chicago Ave., Chicago, Ill., archt. Noted Oct. 22, C. D.—Oct. 24, E. N.-R.

N. Y., New York—SERVICE GARAGE, etc.—See "Contracts Awarded."

N. Y., Niagara Falls—FURNACE BUILDING—Titanium Alloy Mfg. Co., Hyde Park Blvd., taking bids constructing steel, corrugated steel furnace building, Hyde Park Blvd. Private plans. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

CONTRACTS AWARDED

Ala., Decatur—MILL—Alabama Hosiery Mills, constructing brick mill addition, to C. M. Guest & Sons, Anderson, S. C. Est. $60,000. C. C. Hartman, Greensboro, N. C., archt.

Calif., Los Angeles—MARKET, etc.—Broadman Development Co., South Broadway between 87th and 88th Sts., 1 story, basement, 125x148 ft., and 110x125 ft., rein.-con. market and store, 8721 35th South Broadway, to R. E. Millsap, 603 Pacific Commerce Bldg., about $50,000. Noted Feb. 6, C. D.—Feb. 13, E. N.-R.

Calif., Los Angeles — WAREHOUSE — California Hardware Co., 500 East 1st St., 5 story, 60x125 ft., Class A warehouse, 107 South Rose St., to Stanton-Reed Co., 816 West 5th St., $100,000. Noted Mar. 6, C. D. — Mar. 12, E. N.-R.

Calif., Palo Alto—GARAGE and SERVICE, etc.—W. P. Goodenough, general contractor, 569 Lowell Ave., electrical work for 1 story, 100x115 ft., garage and service building, to Callahan Electric Co., Palo Alto, for F. S. Stephens, 550 Melville Ave., (to be leased to R. Atwater, Palo Alto, Chevrolet agent)***heating, plumbing and sheet metal work, to Anderson Plumbing Co., Palo Alto***steel sash, to Soule Steel Co., 1750 Army St., San Francisco***reinforcing steel, to San Jose Steel Co., San Jose***structural steel, to Schrader Iron Wks., 1247 Harrison St., San Francisco. Noted Mar. 13, C. D.—Mar. 19, E. N.-R., under "Contracts Awarded."

★ **Calif., Woodland**—SUGAR REFINERY—Spreckels Sugar Co., 2 Pine St., San Francisco, sugar refinery, Yolo Co., separate contracts. Total est. $1,500,000. Construction will be started in July. K. A. Miserole, c/o owner, 2 Pine St., San Francisco, is engineer in charge. Noted Oct. 29, C. D.—Oct. 31, E. N.-R.

Conn., Bridgeport—FACTORY—Edwin Moss & Sons, general contractors, 729 Union Ave., heating for 1 story, 90x220 ft., brick, steel plant addition, to Mitchell & Bailey, 756 Railroad Ave., for Hemco Division, Bryant Electric Co., H. E. Seim, genl. mgr.***plumbing, to Berger & Greather, Inc., 181 Pequannock St.***painting, to Arthur Wilkes, 163 Sherwood Ave.***steel, to Leake & Nelson, Ash St.***sprinkler system, to Grinnell Co., Providence, R. I. Noted Mar. 16, C. D.—Mar. 19, E. N.-R., under "Contracts Awarded."

Conn., Danbury—FACTORY—Neumann-Endler, Inc., Industrial Corp., Odd Fellows Bldg., general contract 2 story, 61x82 ft., brick, steel addition, Power St., to B. J. Dolan, Main St., Bethel. Est. $37,000. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

Fla., Fort Meade—PLANT—American Cyanamid Co., 30 Rockefeller Plaza, New York, acquired 4,500 acres of phosphate property southwest of here, and will erect a mining, washing and drying plant, work consists of removing, mining, loading, crushing, washing and drying works from exhausted to fresh deposits, day labor. Est. about $250,000. Some equipment and materials to be purchased. H. L. Mead, Brewster, engr. in charge.

Ill., Chicago — FACTORY — Chicago Flexible Shaft Co., 5600 West Roosevelt Rd., 2nd floor, 83x300 ft., brick mill factory addition, 5600 Roosevelt Rd., to All Building Corp., Co., 205 North Central Ave. Bids Mar. 9, awarded Mar. 13. Noted Mar. 6, C. D.—Mar. 5, E. N.-R.

Ill., Rockford — PLANT — Rockford Screw Products Co., general contract 1 story, 100x120 ft. plant addition, to Linden & Sons, Rockford. Est. exceeds $37,000 with equipment.

Mass., Cambridge—FACTORY, etc.—Dewey & Almy Chemical Co., 235 Harvey St., 2 story, basement, 57x142 ft., brick veneer, mill construction office building and factory addition, concrete found., Harvey St., to L. C. Blake, 50 Dyer Ave., Milton. Est. exceeds $75,000. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

Mass., Lynn — BOILER HOUSE — Stone & Webster Eng. Corp., 49 Federal St., Boston, engrs., superstructure for 5 story, 48 x 65 ft., brick, stone, steel boiler house, Broad St., for Lynn Gas & Electric Co., 90 Exchange St., to E. C. Blanchard Co., 940 Broad St., West Lynn. Noted Mar. 5, C. D.—Mar. 12, E. N.-R.

Mass., Salem—FACTORY—Leslie R. Porter Co., general contractors, 156 Stuart St., Boston, cast stone for factory, to Emerson & Norris Co., 163 North Beacon St., Brighton (Boston), for Hygrade-Sylvania Corp., 60 Boston St.***steel sash, to Truscon Steel Co., 38 Chauncy St., Boston***chimney, to American Chimney Corp., 252 Dover St., Boston. Owners awarded contract for elevator to F. S. Payne Co., 75 Rockdale Ave., Cambridge, separate from general contract. Noted Feb. 20, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

★ **Mich., River Rouge**—GAS HOLDER—Ford Motor Co., Dearborn, constructing welded steel gas holder, 10,000,000 cu.ft. capacity in connection with coke oven plant expansion, to Stacy Bros. Gas Constr. Co., 5535 Vine St., Elmwood, Cincinnati, O. Est. $1,000,000. Concrete foundation to be let under separate contract. Private plans. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

Mo., St. Louis—PUBLISHING PLANT—Daily Record Co., H. B. Morse, pres., 1010 Fullerton Bldg., general contract 3 story, basement, rein.-con., limestone, granite publishing plant, 10th and Market Sts., to Dickie Constr. Co., 517 Louderman Bldg. Est. about $125,000. Bids Feb. 6. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

Mo., St. Louis—OIL PLANT—Great Eastern Oil Co., Rutger and Merchant Sts., general contract 1 story, balcony, 30x75 ft., concrete, brick addition to oil plant building, 3rd and Rutgers Sts., to W. C. Harting Constr. Co., 722 Chestnut St. Bids Mar. 10. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

N. J., Newark — FACTORY — Ment Holding Corp., 133 Kosowith St., constructing 3 story, basement, 120x219 ft. addition to present 1 story building, additional 2 stories on top of present 1 story building, to G. Siegler Co., 24 Journal Square, Jersey City. B. S. Gruzen, Concourse Bldg., Jersey City, archt.

N. Y., Brooklyn—FACTORY—Bebroe Realty Co., c/o L. Zirinky, 25 Willoughby St., 4 story, factory, McKibben St. near Bushwick St., separate contracts now being awarded. To exceed $40,000. M. Klein, 65 Court St., archt. Noted Feb. 20, C. D.—Feb. 27, E. N.-R.

N. Y., Buffalo—BOILER HOUSE, etc.—Air Reduction Sales Co., 730 Grant Ave., constructing boiler house and garage, at 730 Grant St., own forces. Will purchase materials. Private plans. Noted Mar. 16, C. D.—Mar. 19, E. N.-R.

N. Y., Buffalo—FACTORY—Schutte Pulverizer Corp., Clyde St., general contract brick, steel factory, plain found., Kensington Ave., to W. W. Grupp, 1170 Jefferson Ave. Private plans.

N. Y., New York—SERVICE GARAGE, etc.—Metropolitan Savings Bank, 754 Bway., 1 story, 40x100 ft., brick service garage and shop, plain found., 316 East 23rd St., separate contracts. A. A. Tearle, 155 East 44th St., archt.

N. Y., Johnson City — FACTORY — Endicott Johnson Corp., constructing 5 story, basement, 85x125 ft., brick, steel rubber footwear factory, plain found., 50,000 sq.ft. floor space, own forces. To exceed $100,000. Private plans.

N. Y., Niagara Falls—WAREHOUSE, etc.—Krueger Motor Sales Co., 835 Winslow Ave., Niagara Falls, general contract warehouse and paint shop, to John Smith & Co., 3420 Highland Ave.***plumbing, to Howard Einsfield, 210 78th St.***heating, to Mathews Plumbing & Heating Co., 922 Ontario Ave.***electrical work, to Rohrer Electrical Co., 1313 Main St. C. F. Obenhack, archt., Gluck Bldg., soon lets contract for freight elevator. Noted Mar. 19, C. D.—Mar. 12, E. N.-R.

N. C., Winston Salem — PLANT — Caroline Narrow Fabric Co., doubling plant capacity of former Orinoco Supply Co. plant, North Chestnut St., separate contracts awarded. $45,000 or more with equipment.

N. C., Asheville—LAUNDRY—See "Unclassified."

O., Barberton—FACTORY—Pittsburgh Plate Glass Co., Grant Bldg., Pittsburgh, Pa., 15 storage tanks (about 250 tons of steel), for plant improvements and additions, to Chicago Bridge & Iron Wks., 37 West Van Buren St., Chicago, Ill. Noted Nov. 12, C. D.—Nov. 14, E. N.-R., under "Contracts Awarded."

O., Cincinnati—POWER HOUSE—Union Gas & Electric Co. (Part of Columbia System) 4th and Main Sts., brick, concrete addition to present plant, plain found., 2nd St., to Ferro Concrete Constr. Co., 4th and Plum Sts. $300,000. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

Pa., Oakmont — STEEL MILL — Edgewater Steel Co., Oakmont, 70x227 ft. steel mill. Owner builds, with exception of roofing. Owner taking bids on roofing. Private plans.

Va., Waynesboro—TEXTILE PLANT—Crompton-Shenandoah Co., Waynesboro, altering former General Electric Building into textile plant, separate contracts awarded. $37,000 with machinery and equipment.

Wis., Milwaukee—BREWERY—Miller Brewing Co., 4002 West State St., general contract 1 story, basement, 30x117 ft., brick, rein.-con., steel pitch house for brewery, West State St., to W. W. Oeffiein, Inc., 312 East Wisconsin Ave. General contractor sublet contract for steel, to Milwaukee Structural Steel Co., 4122 West State St.

Wash., Walla Walla—Libby, McNeil & Libby, constructing 1 story, 100x200 ft., brick warehouse and 1 story, 60x150 ft. cooling building, to Austin Co., Dexter Horton Bldg., Seattle, $50,000. Awarded Mar. 9. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

W. Va., Huntington—PLANT—Standard Ultramarine Co., constructing plant addition, separate contracts awarded; structural steel and erecting, to J. J. Weiler & Sons, Huntington. Est. $40,000.

Wis., Milwaukee—TERMINAL—F. F. Drolshogen, archt., 647 West Virginia St., excavating, concrete, carpentry and masonry work for 1 story terminal shed, West Virginia St., for Pfister & Vogel Co., 547 West Virginia Ave., to Dahlman Constr. Co., West Olive St. and North Palmer Ave.***structural steel, to Hockendahl & Schmidt, 333 South 16th St.***overhead doors, to Overhead Door Co., 1736 North 2nd St.***roofing, to Winding Rfg. Co., 110 East Wisconsin Ave. Bids Feb. 29, awarded Mar. 11. Noted Feb. 21, C. D.—Feb. 27, E. N.-R.

Ont., Goderich—POWER HOUSE—Goderich Salt Co., West St., C. Wurtele, owner, new power house, to Atwood Ltd., 660 St. Catharine St., Montreal, Que.***boiler feed pumps, to Canadian Ingersoll Rand Co., 27 Wellington St. E., Toronto***coal handling equipment, to Stephens Adamson Co., 926 Bank of Hamilton Bldg., Toronto***structural steel, pulverizers and miscellaneous steel, to Dominion Bridge Co., 1139 Shaw St., Toronto. Est. $72,000. Start works in April. C. S. Robinson, 33 North Michigan Ave., Chicago, consult. engr. Noted Mar. 11, C. D.

Ont., Hamilton—FACTORY—Kraft Containers Ltd., c/o H. S. Littlejohn, pres., 47 Duke St., constructing 1 and 2 story, 121x471 ft., brick, steel factory for corrugated shipping containers, to W. H. Cooper, 42 James St. N. Est. $100,000. A. M. Piper, Moore Bldg., London, archt. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

†*Federal Government.*

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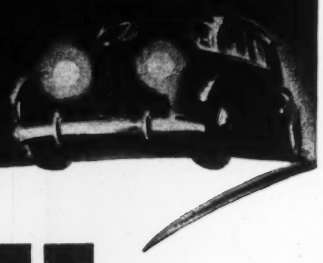

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At the recent meeting of the American Association of State Highway Officials, an authoritative speaker pointed out this fundamental fact: *A light-colored matte surfaced pavement offers best visibility and therefore greatest safety by night.*

Concrete meets that requirement perfectly. Its light gray matte surface reflects more light; brings obstacles and pedestrians into relief; makes passing safer. Its sharply defined edge helps motorists stay on the road.

Concrete conforms to the standards for safe pavements set up by the Illuminating Engineering Society in 1934. In the proceedings of the 13th annual meeting of the Highway Research Board it is stated that the reflection factor for portland cement concrete is many times higher than that of dark colored pavements.

That's only a part of concrete's story. In addition, it is skid-resistant, wet or dry . . . it saves motorists money by reducing gas, tire and repair bills . . . it costs less than other pavements of equal load-bearing capacity . . . and no other pavement even approaches its economy of surface maintenance.

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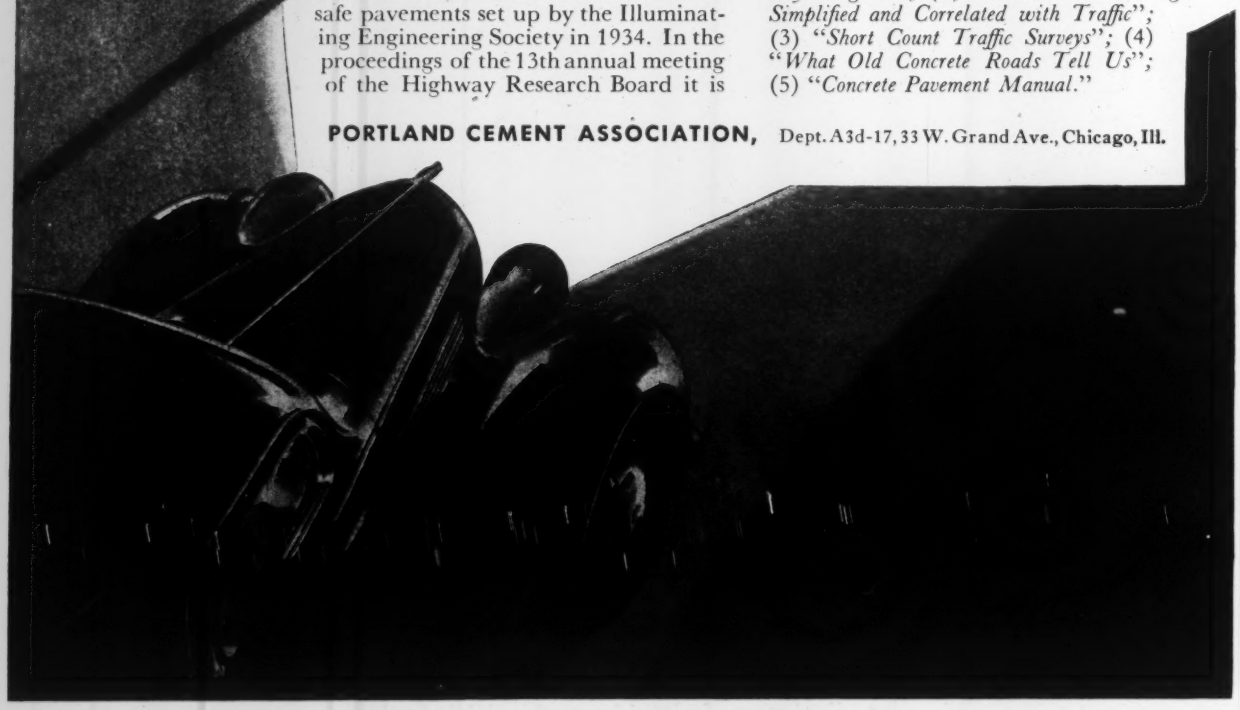
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